

REPORT
OF THE
MINISTER OF AGRICULTURE
FOR THE
DOMINION OF CANADA
FOR THE
YEAR ENDED OCTOBER 31
1903

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OTTAWA

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REPORT
OF THE
MINISTER OF AGRICULTURE
1903

To His Excellency the Right Honourable Sir GILBERT JOHN ELLIOT, Earl of Minto, and Viscount Melgund of Melgund, County of Forfar, in the Peerage of the United Kingdom, Baron Minto of Minto, County of Roxburgh, in the Peerage of Great Britain, Baronet of Nova Scotia, Governor General of Canada.

MAY IT PLEASE YOUR EXCELLENCY—

I have the honour to submit to Your Excellency the annual report of the Department of Agriculture, for the year ended October 31, 1903.

I.—GENERAL REMARKS.

The work of the department has been carried on efficiently, and a synopsis of the operations of the various branches comprised therein is laid before Your Excellency under their respective headings.

The legislation affecting the department during the last session consisted of Chapter 6, 3 Edward VII., intituled 'An Act to prohibit the importation, manufacture or sale of adulterated, process or renovated butter, oleomargarine, butterine or other substitute for butter, and to prevent the improper marking of butter.'

Chapter 11, 3 Edward VII., intituled 'An Act respecting infectious or contagious diseases affecting animals.'

Also Chapter 46, 3 Edward VII., 'An Act to amend the Patent Act.'

By Order in Council of August 30, 1902, in virtue of the provisions of Section 12 of Chapter 69 of the Revised Statutes of Canada, the destruction of any or all horses affected with the disease of glanders was authorized with a view to exterminating as early as possible this disease in the Dominion of Canada, vide *Canada Gazette*, vol. xxxvi., p. 441.

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By Order in Council of December 15, 1902, in view of the fact that there prevails in certain parts of the New England States, forming part of the United States of America, an infectious disease affecting animals, known as 'Foot and Mouth' disease; and in virtue of the provisions of Chapter 69 of the Revised Statutes, intituled 'An Act respecting infectious or contagious diseases affecting animals,' it was ordered that the introduction or importation into Canada of cattle, sheep or other animals or swine, or their skins, hides, horns, hoofs, wool or bristles, coming from the States of Maine, Vermont, New Hampshire, Massachusetts, Connecticut and Rhode Island, forming part of the United States of America aforesaid, shall be prohibited until otherwise ordered. Provided, however, that the dried or pickled or salted green cured skins or hides, and the horns, hoofs, wool and bristles of cattle, sheep or other ruminants or swine may be imported into Canada when originating outside of the said six states and not produced from animals grown or slaughtered in any of the said six states, although shipped from the said six states under regulations to be made by the Department of Customs, approved by the Minister of Agriculture. Vide *Canada Gazette*, vol. xxxvi., p. 1145.

By Order in Council of January 15, 1903, the Order in Council of January 5, 1901, by which nursery stock was permitted to enter Vancouver, in the province of British Columbia, during the winter months only, from October 15 to March 15, was amended by extending the time from October 15 to April 15, instead of March 15. Vide *Canada Gazette*, vol. xxxvi., p. 1434.

By Order in Council of February 7, 1903, the Order in Council of December 15, 1902, respecting the prohibition of the importation or introduction into Canada of cattle, sheep, or other ruminants, or swine, from certain states forming part of the United States of America, owing to the prevalence therein of an infectious disease affecting animals, known as 'Foot and Mouth' disease, was amended by adding after the word 'ordered' in the second paragraph thereof, the following words to wit:—

'Except that animals not previously having been in any of the said quarantined states may pass from one part of Canada through the said State of Maine by the Canadian Pacific Railway, to another part of Canada; provided said animals be so carried in bonded cars sealed, that they cannot be removed from said cars while within the said State of Maine.' Vide *Canada Gazette*, vol. xxxvi., p. 1620.

It was thought advisable from the experience gained during the past few years, to amend the Animal Contagious Diseases Act, which was found unwieldly and to simplify it and render it more workable.

I therefore introduced in parliament a bill in which a considerable number of changes were embodied.

This Bill was introduced early in the session, and after full discussion and amendment in both Houses of Parliament, received the Royal Assent and became law on August 13 last.

By this Act 'The Animal Contagious Diseases Act,' Chapter 69, of the Revised Statutes of Canada, and Chapter 13, of the Statutes of 1896 (first session), in amendment thereof, are repealed.

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During the recent session I introduced in parliament a Bill respecting the inspection and sale of seeds, which on second reading, was amended.

Although the general principles of the Bill are strongly supported, it was considered wise to allow it to stand until the next session of parliament, in order that those interested might have an opportunity to examine more closely into its provisions, and submit views as to any difficulties which such a law might bring about in the trade in seeds.

During the year just passed the chief event connected with the work of my department in which I personally was concerned, was the participation in the Fifth National Exhibition of Japan, held at Osaka from March 1 to July 1.

The government on my recommendation, believing this to be an exceptional event, thought it necessary that I should go to Japan during the Exhibition, as Commissioner Extraordinary.

I have for a long time felt it very important that Canada should make a determined effort to secure a share of the trade between America and the orient. This has been practically monopolized by the United States, the merchants of that country even handling such Canadian goods as have been sold in Japan. This has been the case to such an extent that the Japanese people did not realize that they were purchasing any Canadian goods, and knew practically nothing of our country. The only way in which Canada came to the notice of the people of Japan was in connection with the legislation of British Columbia for the exclusion of Japanese, and for the purpose of creating disabilities for such Japanese as were in Canada, in their industrial pursuits.

An opportunity was given Canada to participate in this international exhibition by an invitation which was extended to the government by the Consul General of Japan, Hon. Mr. Nosse. I urged upon my colleagues the advisability of accepting this invitation, and of sending a carefully prepared exhibit of such Canadian products and manufactures as were likely to attract the attention of the Japanese and to be suitable for export to that country.

Mr. William Hutchison, the exhibition commissioner, was authorized to take charge of this work, prepare the exhibit, forward it, install it at the exhibition, and do whatever was possible to make it a success. I wish to congratulate him and all who were concerned in the work on the great success that attended their efforts.

We secured the erection of a special building by the exhibition authorities for our exhibit. This was placed in a most conspicuous location, and was very satisfactorily provided for us. Our exhibits arrived in good order and were installed under the direction of Mr. Hay, of my exhibition staff. The installation, arrangement and decoration was quite unique and most successful, so much so that we were awarded the medal which was offered by the authorities in Japan for the most artistic and best arranged exhibit.

The exhibition at Osaka was in itself a remarkably successful one. I can compare it most favourably with the international exhibition which was held at Buffalo, in the United States, last year, in which we also took part.

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I must congratulate the Japanese authorities on the excellent manner in which the exhibition was organized, administered, and worked out. The exhibits of Japanese products and manufactures, art and historical collections, were beautifully arranged in such a way as to enable the spectator to enjoy them, or the student to utilise them to the best advantage.

There were over four million people who visited the exhibition, and the vast majority of these entered and carefully examined our Canadian building. One fact was strikingly noticeable, that the Japanese not only went about looking cursorily at things, but there was a very large number of young men who examined and studied closely and took copious notes of everything that they saw.

One instance will illustrate the results of this. We had a complete bread-baking outfit in the exhibition, which was soon sold to an Osaka baker, to be delivered at the end of the exhibition and used by him in his trade. Long before the end of the exhibition a similar outfit was constructed and set up, and in operation by a baker in the city, modelled on ours and apparently in every respect just as successful.

The exhibition was a means of attracting very great attention to Canada, and Canadian products all over Japan, and even in the adjacent oriental countries, China, Corea, the Philippines, the Straits Settlements, &c., because visitors from all these countries were very numerous, and they made a point of inspecting the Canadian building.

The report of my commissioner, which is an appendix to this volume, goes into details of the Canadian trade which may be opened up in the Orient. I would, however, here personally impress upon the Canadian producer and manufacturer the absolute necessity of prompt action in this respect. The United States merchants and exporters now possess the market there as far as United States products are concerned. They are active and energetic, and it will require that our people should take steps to meet them and beat them on the ground.

The exhibition has paved the way for success in this effort. We are able to show the great superiority of Canadian hard wheat flour to that which the United States has been exporting to Japan. We were able to show a small collection of excellent furniture such as has never been seen before in that country. We were able to show a complete exhibit of pulp wood, pulp and paper such as had never been seen, and which attracted a great deal of attention. Our dairy products, fruits, biscuits and canned goods also were *en evidence* and proved that Canada could produce these things as well or better than any of her rivals in the Japanese markets. The Japanese are now ready to take Canadian goods, but they will not do so unless the Canadian exporter gives them the opportunity, and they will buy the United States and other goods instead of ours if the United States and other agents are on the spot and push their wares, while our agents are not to be found.

It was considered that this Oriental trade was of such importance that it would be well for me to personally visit the exhibition and see what could be done. It was appreciated also that with an Oriental people the presence of a member of the government, with the suitable introduction, would attract more attention to our exhibit and

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to our trade than could in any other way be secured. It was, therefore, arranged for a personal visit to Japan. The authorities seemed to be much flattered by the presence of a Minister of the British Crown in their country, and received me with a great deal of attention, and accorded me every facility for best securing what I desired.

I had the honour of being presented to the Emperor and Empress, and also of receiving them in a special visit to our Canadian building when they inspected the exhibition. In Japan such an honour is valued very highly, and was considered to be a mark of special friendship for and attention to Canada; and this Imperial visit to our exhibit secured for our country and for our exhibit an attention which nothing else could possibly have brought about. Their Imperial Majesties expressed themselves as greatly pleased with our exhibit.

I caused to be sent to them specimens of Canadian fruits, preserves and bread, which were used in the palace, and which were pronounced there to be most excellent. This of itself aided very much in the general appreciation of our goods. A piano also and several articles of furniture which were on exhibition were purchased for the Imperial and governmental households.

Nearly every one of our Canadian exhibits was left in the country, and will serve as an advertisement for Canadian goods and products. Since the exhibition opened I am extremely gratified to say that numerous and extensive orders have come from Japan for some of our products, and the trade with that country is being steadily and extensively increased. This justifies our participation in the exhibition, and I am sure that an abundant and full return will come to the country for the money expended.

Our participation in the St. Louis exhibition, which opens next May, has necessitated continued preparations, which I am glad to say are now in a very forward state, and I trust that when the time comes Canada will be thoroughly well represented there. The contract for our building at St. Louis has been let, and the building almost completed.

The question of our participation in the live stock exhibit is still under consideration. A number of the live stock men of Canada earnestly desire to send Canadian stock to the exhibition, but difficulties present themselves in regard to the conditions under which this stock must be exhibited. I trust, however, that these difficulties will be overcome, and that Canada will be able to make a satisfactory and successful exhibit.

I have, as usual, visited the great agricultural gatherings of the country, the Guelph Fat Stock Show, the Dairy Convention meetings, and others of a more local character. I am glad to congratulate the farmers of Canada on the continued and increasing interest which is taken in these great gatherings. The discussions and illustrations which are thus brought about are of the utmost value to the progress of agriculture in the country; and the organization which my department has now made, enabling the best authorities and experts upon various agricultural subjects to be brought to these gatherings and there express their views, is one of the most important educational features in our Canadian agriculture. I hope to be able to still more increase this work and the benefit that accrues from it.

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In this connection I must, however, express regret that the head of my agricultural and dairying branch has been absent from this work. Professor Robertson's health broke down early last summer, and he has been obliged to take a lengthened leave of absence. I am glad to know that with rest his health is improving, and I trust that before long he will once more be able to take up the very valuable work that he has done for Canadian agriculture.

During the absence of the Commissioner of Agriculture and Dairying, the work of his branch has been most efficiently carried on by Mr. J. A. Ruddick, acting commissioner, and the other officers of the branch.

I am pleased to say that the improvements at the Grosse Isle quarantine station have been brought to a completion, and that now that station may be said to be thoroughly well equipped for the purpose for which it is intended. The prospects are that a much larger number of immigrants will come to St. John, N.B., during the coming winter. Apparently it will be necessary to immediately increase the accommodation there.

Constant improvements are being made at the quarantine stations at Halifax, St. John, and Victoria, B.C., which are materially adding to the efficiency of these stations.

The work of the health of animals branch is found to be largely increasing. With the constant presence of the chief of this branch at headquarters in Ottawa, the people of the country at large who are interested in veterinary work have found more complete and more prompt attention to their various demands and necessities, and with these the obligations of the department are constantly increasing. It has, therefore, been found necessary to somewhat increase the permanent staff of professional men, and also the office staff, but the good which I am sure will result to the live stock interests of the country will well compensate for this addition.

II.—ARTS AND AGRICULTURE.

BRANCH OF THE COMMISSIONER OF AGRICULTURE AND DAIRYING.

The branch of the Commissioner of Agriculture and Dairying has been subdivided into divisions, in order that the constantly increasing volume of work assigned to it, may be more systematically and effectively dealt with. The divisions already organized are the 'live stock division,' the 'dairy division,' the 'cold storage division,' the 'fruit division,' the 'poultry division,' the 'seed division,' and the 'extension of markets division.' The work of these divisions is under the general direction of the Commissioner of Agriculture and Dairying, with a chief officer, who takes up the details, in immediate charge of each one, except the cold storage division, which is under the joint supervision of the Commissioner of Agriculture and Dairying and the chief of the dairy division.

The chiefs of divisions are men of technical training and experience along the line of the work entrusted to them. The general object of the work in the branch of the Commissioner of Agriculture and Dairying is to render assistance towards the improvement of all agricultural products, including the means and methods of their

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production, transportation and marketing, with particular regard to those which may be grouped under the name of food products.

The export commerce of the country in most of the farm products is increasing at a very rapid rate. The following statement of the value of the exports of some of the farm products of Canada during the years 1896 to 1903, shows the growth in that period and indicates somewhat of the great possibility for further expansion of this trade:—

VALUE OF SOME CANADIAN FARM PRODUCTS EXPORTED FROM 1896 TO 1903.

(Years ending June 30.)

	1896.	1897-	1898.	1899.	1900.	1901.	1902.	1903.
	\$	\$	\$	\$	\$	\$	\$	\$
Wheat.....	5,771,521	5,544,197	17,313,916	7,784,487	11,995,488	6,871,939	18,688,092	24,566,703
Flour	718,433	1,540,851	5,425,760	3,105,288	2,791,885	4,015,226	3,968,850	4,699,143
Oats.	273,861	1,655,130	3,041,578	3,268,388	2,143,179	2,490,521	2,052,559	2,583,151
Oatmeal.....	364,655	462,949	554,757	396,568	474,991	467,807	344,332	537,002
Pease	1,299,491	2,352,891	1,813,792	1,955,598	2,145,471	2,674,712	1,805,718	1,652,743
Cattle	7,082,542	7,159,388	8,723,292	8,522,835	9,080,776	9,064,562	10,663,819	11,342,632
Sheep and lambs.	2,151,283	1,002,011	1,272,077	1,540,857	1,894,012	1,625,702	1,483,526	1,655,681
Cheese	13,956,571	14,676,239	17,572,763	16,776,765	19,856,324	20,696,951	19,686,291	24,712,943
Butter....	1,052,089	2,089,173	2,046,688	3,700,873	5,122,156	3,295,663	5,660,541	6,954,618
Pork, bacon and hams.	4,446,884	5,871,988	8,092,930	10,473,211	12,803,034	11,829,820	12,457,863	16,029,269
* Poultry..	18,992	56,792	97,473	139,759	210,822	141,518	238,047	160,518
Eggs... .	807,086	978,479	1,255,304	1,267,063	1,457,902	1,691,640	1,733,242	1,436,130
+Fruits	1,716,278	2,987,839	1,709,360	3,596,415	3,305,662	2,006,235	1,922,304	3,689,662
Totals....	39,659,686	46,377,927	68,919,688	62,528,107	73,281,702	66,872,296	80,705,184	99,420,195

* Dressed and undressed.

+ Including green, dried, canned and preserved.

There has been a much larger increase in the production of these products than is indicated in the preceding table. The increase in population and the greater prosperity of the people generally, has added to the home consumption enormously.

This increase in production is not so much due to an extension of the areas devoted to agriculture as it is to the improved methods of farming now employed, and the progress which farmers are making in ability to manage the forces of nature, for their advantage and profit.

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The erection of large and commodious farm buildings and residences is evidence of the prosperity of those who live upon the land, and a desire on their part to ameliorate the conditions surrounding them in their daily life.

The scarcity of farm labour has become rather pronounced in Ontario and parts of Quebec, and immigrants of the right sort in this class find ready employment at good wages.

A marked feature of the agricultural returns for the past year is the large increase in the export of cheese to the United Kingdom. The unusually cool weather which prevailed, enabled the cheese factories to turn out a superior article, and the improved transportation facilities, including iced cars and cooled air service on the steamships, made it possible for shippers to place it on the market with less deterioration than formerly. As a result, consumption was encouraged to such an extent as to create demand enough to force prices up to a very high level. The incentive of a high price, along with a favourable season for the production of milk, in most districts, resulted in much the largest export of cheese on record. There is in this an indication of the possibilities of the cheesemaking industry in Canada, if we only furnish the right quality.

There has been a good deal of complaint about the 'heated' flavour of our cheese, which is caused by exposure to a high temperature in the curing-rooms and during transit on land and sea. The department endeavours, by illustration and experiment, to impress upon the owners of cheese factories the importance of improving the ordinary cheese factory curing-room, so as to secure the advantages of having cheese cool-cured at all times.

I am informed that since I authorized the establishment of the central cool curing-rooms in the spring of 1902, there has been great activity along this line, and that more real improvement has been made during these two seasons than was made during the previous ten years.

DAIRY DIVISION.

COOL CHEESE CURING-ROOMS.

The cool cheese curing-rooms at Woodstock and Brockville, in Ontario, and Cowansville and St. Hyacinthe, in Quebec, were again operated by my department. During the period from May 18 to September 30, 47,205 cheese were received from 54 factories.

The curing-rooms were taxed to their full capacity, and the cheese from several factories had to be refused for lack of room.

I am informed that the curing-rooms at a large number of cheese factories have been improved already as a direct result of the illustration afforded by the operation of these central curing-rooms. The advantages are so pronounced that it must be only a question of time until provision is made for the cool curing of all cheese.

For the purpose of determining the saving of shrinkage and the comparative quality of cheese cured under the two conditions, 1,120 pairs of cheese from the differ-

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ent factories were set aside during the season, one being cured in the cool room and the other in an ordinary room where the temperature was uncontrolled. In every case the cool cured cheese was superior in quality; and the average saving of shrinkage from May 18 to September 30, was 1.23 per cent.

Owing to the importance of this question, an extended series of meetings will be held in the cheese making districts during the coming winter, at which addresses and demonstrations will be given by the superintendents of the cool curing-rooms, in order that those interested may be in possession of the information as soon as possible.

The curing-rooms are visited by a large number of dairymen and cheese makers, to whom they furnish a useful object lesson, not only in the results obtained, but also in regard to the construction and operation of cheese curing-rooms generally.

OFFICIAL REFEREE FOR BUTTER AND CHEESE.

The official referee for butter and cheese, at Montreal, was called to examine 1.119 lots of cheese and 150 lots of butter, over which there was a dispute as to quality. Cheese and butter are purchased from the factories at a price fixed on the basis of what is known in the trade as 'finest' quality, certain standards being recognized as necessary to that grade. If the buyer finds upon examination that the quality is not up to this standard, the usual practice is to ask for a rebate on the price originally agreed upon. The referee can then be called in, by either the buyer or seller, to give an impartial and disinterested report on the quality. Out of the total number of lots examined during the season, all of which had previously been declared by the buyer to be 'under finest,' the referee pronounced 39 lots of cheese and 4 lots of butter to be up to the standard of 'finest' quality, and his decision was final in all cases.

The official referee performs other duties as supervisor of the work of the inspectors who report on the condition of food products as loaded on the steamships, the placing of thermographs in cold storage and cool air compartments, &c.

THE NORTH-WEST TERRITORIES CREAMERIES.

The Department of Agriculture continues to manage a number of creameries in the North-west Territories. During the season of 1903, there were eighteen in operation, located at the following places: Edmonton, Wetaskiwin, Lacombe, Blackfalds, Red Deer, Innisfail, Tindastoll, Olds, Calgary, Moosejaw, Regina, Prince Albert, Qu'Appelle, Grenfel, Whitewood, Moosomin, Churchbridge and Saltcoats,—being nine in northern Alberta, eight in Assiniboia, and one in Saskatchewan.

Owing partly to the favourable conditions for wheat-growing and partly to the high price paid by local merchants for dairy butter, the creameries in Assiniboia have shown a somewhat decreased output over the previous year, while those in Alberta have made 64 per cent more butter than they did in 1902.

Three more of these creameries have, as a result of the season's operations, repaid all indebtedness to the department, making thirteen in all now in this position.

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During 1902 it was found necessary to ship five carloads of the butter manufactured in these creameries to England. In 1903, although the total output was increased by 130,590 pounds, the whole of it was disposed of in the western, northern and Oriental markets, at an average of about 20 cents a pound. A much larger quantity was sold for the Yukon trade, and several new and important accounts were opened in Japan, as a direct result of the Canadian exhibit at the Osaka exhibition, and the good work done there by the exhibition staff. Regular shipments are now made to the Orient by every steamer, and we seem to be in a fair way to capture the bulk of this trade. The butter for the Oriental trade is largely put up in tins.

Four of the Alberta creameries will be operated all winter.

The experiment has been tried, and proved successful, of collecting eggs from the patrons of the creameries. The eggs were placed in the creamery cold storages and shipped regularly to Calgary with the butter, where they were disposed of at prices which net the patrons 15 to 19 cents a dozen, according to locality, after deducting all expenses.

There is likely to be considerable growth of the creamery industry in northern Alberta.

NOVA SCOTIA CREAMERIES.

The department still operates the dairy station at Nappan, and a creamery at Scotsburn and one at Mabou.

The Scotsburn creamery is making good progress, and promises to be very successful.

Most of the butter manufactured in these creameries is sold in the local markets, but a portion of it is put up for export to the British West Indies.

GENERAL DAIRYING SERVICE.

The Assistant Dairy Commissioner, who resides at St. Denis (en bas), devotes his time largely to the French-speaking districts of the province of Quebec. He has attended numerous meetings and delivered a great many lectures in the interests of dairying and general agriculture. He conducts a large correspondence, giving advice on various subjects, and assists in carrying on the syndicate system of cheese factory and creamery instruction which has been so successful in that province.

A member of the dairy division staff visited British Columbia during the summer, and conducted a series of short courses in butter-making at different places. He also acted as judge of dairy products at several of the larger exhibitions.

An instructor was sent to Prince Edward Island in February, where he took charge of a cheese and butter-making school, covering a course of four weeks. He also spent a month on the Island during the manufacturing season, giving instructions to cheese and butter makers, and addressing meetings of patrons.

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The chief of the dairy division has prepared a complete set of plans and specifications for cheese factory and creamery buildings, of different sizes, embodying all the latest ideas and improvements, and with special reference to control of temperature and sanitation. These are now being prepared for publication and distribution in pamphlet form.

An extensive series of experiments in butter-making, mainly with a view of determining the factors which control the percentage of water in butter, have been conducted under the joint auspices of the dairy division and the division of chemistry of the Experimental Farms branch. Very complete analyses have been made in conjunction with the practical work, and the results, when tabulated, will form an important contribution to original investigation along this line.

A heavy correspondence, largely of a technical nature, is conducted by the dairy division, 5,057 letters having been despatched during the year.

REGISTERED CHEESE FACTORIES AND CREAMERIES.

There are now 1,301 cheese factories and creameries registered under the Act passed in 1897 ‘provide for the registration of cheese factories and creameries,’ &c. &c.

The following table gives the total number of cheese factories, creameries and combined factories in Canada in 1890 and 1900, as shown by the census returns :—

Province.	IN 1890.			IN 1900.		
	Cheese Factories.	Creameries.	Combined C. & B. Factories.	Cheese. Factories.	Creameries.	Combined C. & B. Factories.
Ontario.....	893	45		1,061	103	168
Quebec..	617	111		1,207	445	340
P. E. Island	4			15	5	27
Nova Scotia.....	14	2		15	8	10
New Brunswick...	9	1		49	13	6
Manitoba	23	8		49	26	3
N. W. Territories. .	4	3		2	21	
British Columbia .	1				8	
Totals....	1,565	170		2,398	629	554

BUTTER ACT, 1903.

During the last session of parliament I introduced a bill entitled 'An Act to prohibit the importation, manufacture or sale of adulterated, process or renovated butter, oleomargarine, butterine or other substitute for butter, and to prevent the improper marking of butter.' The bill passed all its stages and became law on August 13, 1903.

It defines the following words and expressions—'Creamery,' 'dairy,' 'butter,' 'creamery butter,' 'dairy butter,' and 'renovated' or 'process butter.'

It fixes a legal limit of water in butter.

It prohibits the manufacture, importation or sale of 'oleomargarine,' 'butterine,' 'adulterated butter' or 'process butter.'

It prohibits the improper marking of butter.

The expansion of our dairy industry in the future depends very largely on the export of creamery butter, and as the extent to which this trade may be developed depends in turn on a high standard of quality being established, we are justified in adopting every possible means necessary to protect the good name of Canadian creamery butter.

The relative selling price of all butter made in Canada is influenced and regulated by the price obtained for that which is exported, and therefore it is obvious that anything which tends to improve that price will help the whole butter trade.

That there is still room for a great increase in our exports of fancy creamery butter to the markets of the United Kingdom is shown by the fact that during the year ended June 30, 1903, we sent only about 6 per cent of the total importation.

The following countries compete with us for this trade, viz. :—

Denmark, Russia, France, Holland, Sweden, New Zealand, Australia, United States, Belgium, Argentina, Norway and Germany. The four first named each supply more at present than Canada does.

In some of these countries very stringent laws have been enacted to regulate the marking, grading and export of butter, but they do not depend wholly on legislation to enable them to capture the trade. They are applying the knowledge gained through investigation and the advancement of dairy science to the production and handling of milk and the manufacture of butter. Canadians must do likewise if they wish to compete successfully in this important trade.

EXPORTS OF BUTTER AND CHEESE.

The magnitude and growth of the export trade of Canada in dairy products is shown by the following tables (years ended June 30) :—

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DOMINION OF CANADA—Exports of Dairy Products—Home Production.
BUTTER.

Year.	Quantity.	Value.	To Great Britain.	To United States.	To France.	To Ger- many.	Other Foreign Coun- tries.	B. N. A. Provinces.	British Indies.
	Lbs.	£	£	£	£	£	£	£	£
1869 . . .	10,649,733	1,698,042	534,707	1,015,702		1,496	14,870	95,777	26,986
1880	18,535,362	3,058,069	2,756,064	111,158			24,710	163,290	2,647
1890	1,951,585	340,131	184,105	5,059			29,342	119,989	1,636
1891	3,768,101	602,175	440,060	10,054		20,447	24,021	101,649	5,944
1892	5,736,696	1,056,058	877,455	6,038		5,160	27,207	133,770	6,428
1893	7,036,013	1,296,814	1,118,614	7,539		1,175	35,042	127,412	7,032
1894	5,534,621	1,095,588	936,422	6,048	1,125		25,560	109,263	14,170
1895	3,650,258	697,476	536,797	5,365		267	35,028	108,439	11,580
1896	5,889,241	1,052,089	893,053	2,729		9,370	34,299	105,472	7,166
1897	11,453,351	2,089,173	1,912,389	6,233		8,513	33,490	115,754	12,794
1898	11,253,787	2,046,686	1,915,550	3,738		17,574	31,619	51,045	27,160
1899	20,139,195	3,700,873	3,526,007	3,984		12,384	41,810	74,813	41,875
1900	25,259,737	5,122,156	4,947,000	5,044		7,210	43,176	66,069	53,657
1901	16,335,528	3,295,663	3,142,353	5,139			39,675	44,986	62,810
1902	27,855,978	5,660,541	5,459,300	41,149		101	36,109	47,066	71,816
1903	34,128,944	6,954,618	6,554,014	10,225		13	198,381	69,017	112,968

CHEESE.

1868	6,141,570	620,543	548,574	68,784			891	1,594	340
1880	40,368,678	3,893,366	3,772,769	114,507			170	5,710	210
1890	94,260,187	9,372,212	9,349,731	6,425		770	2,154	12,777	777
1891	106,202,140	9,608,800	9,481,373	12,427			1,954	9,104	3,884
1892	118,270,052	11,652,412	11,593,690	39,558	2		2,124	12,942	1,900
1893	133,946,365	13,407,470	13,360,237	23,578			2,689	18,679	2,297
1894	154,977,480	15,488,191	15,439,198	9,552		173	3,036	21,948	14,284
1895	146,004,650	14,253,002	14,220,507	5,058		16	5,463	9,785	12,175
1896	164,684,123	13,956,571	13,924,672	10,559	299		4,861	7,509	8,871
1897	164,220,699	14,676,235	14,645,859	4,486	60	24	7,365	11,591	8,457
1898	196,763,323	17,572,765	17,522,681	14,604		1,428	6,889	12,784	14,377
1899	189,827,839	16,776,765	16,718,418	17,739			11,701	13,293	15,614
1900	185,984,430	19,856,324	19,812,670	4,835			8,774	10,751	13,393
1901	195,926,397	20,696,951	20,609,361	37,691	465	12	15,375	16,603	17,534
1902	200,946,401	19,686,281	19,620,239	12,578		1,179	11,111	20,100	18,570
1903	229,693,925	24,712,943	24,620,004	7,779		370	18,942	11,574	44,714

IMPORTS OF GREAT BRITAIN.

The following table from the Board of Trade returns of Great Britain for 12 years (ended December 31), shows the total quantities and value of butter and cheese imported into Great Britain:—

BUTTER.			CHEESE.		
Year.	Quantity.	Value.	Year.	Quantity.	Value.
	[^] Cwt.	£ stg.		*Cwt.	£ stg.
1890.....	2,027,718	10,598,848	1890.....	2,144,074	4,975,134
1891.....	2,135,607	11,591,181	1891.....	2,041,317	4,815,369
1892.....	2,183,009	11,965,190	1892.....	2,232,817	5,416,784
1893.....	2,327,474	12,753,593	1893.....	2,007,462	5,160,918
1894.....	2,574,835	13,456,699	1894.....	2,226,145	5,474,940
1895.....	2,825,662	14,245,230	1895.....	2,133,819	4,675,130
1896.....	3,037,718	15,344,364	1896.....	2,244,525	4,900,342
1897.....	3,217,802	15,916,917	1897.....	2,603,178	5,885,521
1898.....	3,209,153	15,961,783	1898.....	2,339,452	4,970,805
1899.....	3,389,851	17,213,516	1899.....	2,384,069	5,503,004
1900.....	3,378,516	17,450,435	1900.....	2,705,878	6,837,883
1901.....	3,702,890	19,297,396	1901.....	2,586,837	6,227,135
1902.....	3,974,933	20,526,690	1902.....	2,546,612	6,412,002

* Cwt. : 112 lbs.

COLD STORAGE DIVISION.

The development and use of cold storage during recent years has revolutionized the methods of supplying the markets of the world with perishable food products. Staple foods like butter and cheese or eggs, of which there is a constant and regular consumption, but which are produced at certain seasons of the year in excess of the demand, must necessarily be accumulated to meet the needs of the period of non-manufacture or light production. Cold storage is a means of preserving such foods with a minimum of deterioration, and thus consumption is increased.

Tender varieties of fruits and certain kinds of vegetables which formerly were available only during a very limited period, may now be procured throughout the greater part of the year. The period during which the products of given localities are available has been extended, and the improved transportation facilities have brought remote parts of the world into closer touch, so that full advantage may be taken of the variations in seasons, and the more favoured localities are able to supply those districts where some food products cannot be successfully grown.

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The whole question of cold storage and refrigeration is a comparatively new one, and although there has been great advancement made during the past ten years, or even during the past five years, there is yet much to learn. As improvement is made and definite standards are established, the benefits derived will be correspondingly greater.

COLD STORAGE AND COOLED AIR ON STEAMSHIPS.

The Department of Agriculture, realizing that expansion in the profitable production of food products depends on the exportation of these products in the very best possible condition, has, by granting subsidies to the railway and steamship companies, secured services which permit of perishable products being safely handled and landed on the British markets in good condition. Without the refrigerator car service and the cold storage on steamships, a successful export trade in butter or tender fruits would be quite impracticable.

In the season of 1903, there were 172 sailings of 37 steamers from the port of Montreal, having cold storage accommodation, and 61 sailings of steamers fitted with cooled air chambers. The particulars are as follows:—

NUMBER OF STEAMERS, SAILINGS AND CAPACITY.

COLD STORAGE.

Destination.	No. of steamers.	No. of sailings.	Cu. ft. capacity.
Liverpool	10	59	228,890
London	6	27	100,734
Bristol	8	32	243,354
Glasgow	10	43	107,980
Manchester	3	11	26,000
Totals	42	179	853,858

COOLED AIR.

Liverpool	4	20	135,600
London	5	24	238,000
Bristol	2	6	53,000
Glasgow	3	11	65,000
	14	61	491,600

There were also seven sailings to South Africa of steamers with cold storage.

The contracts entered into with agents of steamship companies, which provided for a cooled air service on twelve steamers, all expired at the close of navigation in the St. Lawrence, for the season of 1903.

Two other steamers were fitted with cooled air plants without any subsidy from the department.

The following statement gives the number of packages of butter and apples carried in cold storage to various ports:—

Destination.	Butter, Packages.	APPLES.	
		Barrels.	Boxes.
Liverpool ..	80,714	6,370	375
London,. . .	83,064	8,204	1,849
Bristol ..	130,252	.....	975
Glasgow ...	22,273	7,260	23,537
Manchester .	19,092	.. . . .	366
	335,395	21,834	27,102

There were 6,734 cases of pears carried in cold storage and 916 cases as ordinary cargo.

In addition to the preceding there were 10,674 cases of American pears and small fruits carried in cold storage.

Only 454 packages of butter were carried as ordinary cargo during 1903, as against 1,593 packages during the previous season.

There were 43,800 boxes of cheese and 5,355 cases of Canadian bacon and 10,542 cases of American bacon carried in cooled air chambers during the season of navigation from the port of Montreal.

The following statement gives the number of packages of butter carried in cold storage, from the port of Montreal, since 1898:—

1898.....	209,172
1899.....	429,734
1900.....	227,863
1901.....	410,893
1902.....	525,735
1903.. . . .	335,395

There was ample space for all the cargo offered, either for cold storage or cooled air. It may be noted that there was a falling off in the shipments of butter for the

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season of 1903. This was due to the relatively high price for cheese, which induced the combined factories to make cheese instead of butter.

During the season there were 199 thermographs placed in different parts of steamships sailing to Great Britain. They were placed as follows:—

Destination.	Cold Storage Chamber with Butter and Fruit.	Cooled Air Chamber with Cheese and Fruit.	Ordinary Storage with Cheese and Fruit.
Liverpool..	45	6	9
London..	30	20	2
Glasgow...	33	3	1
Bristol.....	36	3	
Manchester.	11		
Totals..	155	32	12

The following table shows the highest average temperature of any voyage and the lowest average of any voyage, recorded in cold storage chambers for butter, season 1903:—

Lines.	Ports.	Highest Average of any Voyage.	Lowest Average of any Voyage.
		Fahr.	Fahr.
Canadian Pacific...	Montreal to Bristol.. . . .	38	24
Dominion .. . . . .	..... . . . .	30	9
Donaldson.....	Glasgow	39	25
Allan..... . . . .	..... . . . .	35	17
Dominion..	Liverpool	36	10
Allan .. . . . .	..... . . . .	40	15
Thomson	London	43	19
Allan.. . . . .	..... . . . .	35	24
Manchester liners...	Manchester	33	22

REFRIGERATOR CARS FOR BUTTER.

The refrigerator car service for the carriage of butter was again operated by the railway companies under arrangement with the Department of Agriculture. Cars were

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started at 49 different points, and were available for shipments of butter at all stations on the routes to Montreal. The cars were run, weekly or fortnightly, according to the requirements of the route, on an advertised schedule, so that shippers might know when to deliver the butter at the stations with the least possible exposure to heat.

Shippers were charged the current 'less than carload' rates, without extra charge for icing.

This service was in operation from May 18 to October 15. The department guaranteed two-thirds of the earnings of a minimum car (20,000 lbs.), plus \$4 a car for icing. When the earnings exceeded the guarantee, there was no charge against the department. If the traffic on any route exceeded one carload, the whole service on that route was held to be self-sustaining, and no claim could be made on the department, even if the earnings of the extra cars did not reach the amount of the guarantee.

The arrangement did not apply to special cars ordered for taking a full carload from a single point.

The subsidy, or guarantee, was given to secure a regular service for shippers of comparatively small lots, who would otherwise be compelled to pay for a whole car, or hold the butter until a carload was accumulated, in which case there would be serious deterioration in the quality of the butter.

Inspectors were employed going over the refrigerator car routes, reporting regularly on the working of the service, and endeavouring to have defects in the handling of the butter remedied as promptly as possible, whether they occurred at the creamery, in the hauling to the station, or while the butter was in charge of the railway company.

REFRIGERATOR CARS FOR CHEESE.

The department agreed to pay the cost of icing 105 cars a week, distributed among the different railroads, for the carriage of cheese to Montreal from July 1 to September 12.

The railway companies agreed to furnish the cars, properly iced, upon application from shippers, for the transportation of cheese in carloads, up to the number allotted to each railroad. Although the summer was exceedingly cool, this service is reported to have been of great advantage.

INSPECTION OF REFRIGERATOR CARS.

An inspector was stationed at Montreal, whose duty it was to examine both the cheese and butter cars as they arrived, and report on the condition and temperature of the contents, as well as the condition of the car as regards icing and cleanliness. Much useful information has been secured from this inspection. Weak spots in the transportation of perishable products have been discovered and pointed out to the responsible parties. If the cars on any route are found arriving short of ice, the railway officials are immediately notified. Creamery owners are notified of any shortcomings on their part. The presence of the inspector is a constant check on the employees of

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the railway and cartage companies, and promotes the careful and prompt handling of this class of freight. It is evident from the temperatures reported, that much of the butter is still delivered to the cars at too high a temperature.

The refrigerator car inspector paid particular attention to arrivals of early apples and tender fruits, carried in refrigerator cars, with and without ice. The fruit in un-iced refrigerator cars was not any cooler than that in ordinary cars, and it was often found to be as much as 10 degrees warmer than the air outside the car, a condition due, no doubt, to the heat generated by the ripening fruit, which was retained by the insulation of the car. The ice hatches are usually left open when the car is not iced, in order to provide ventilation, but the plan does not appear to be very effective. The temperature of the fruit, inside the packages, in many of these un-iced refrigerator cars was recorded as high as 78 degrees, while the highest temperature found in the fruit of a car properly iced was only 64 degrees, and varied down to 52 degrees. Some cars were inspected in which the ice had all melted and the interior had become very warm.

COLD STORAGE AT CREAMERIES.

In 1897 I asked parliament to ratify an arrangement whereby any creamery owner who constructed a cold storage in connection with his creamery, would be entitled to a bonus of \$100, payable in three annual instalments, if certain conditions were complied with. These conditions were (1) proper construction, according to plans and specifications furnished by officers of the department, (2) the maintenance of a low temperature throughout the period of manufacture, and the furnishing of reports giving a daily record of same, and (3) the manufacture of a stipulated quantity of butter during the season.

Up to the present time 496 creameries have received the first instalment of \$50, 346 have also received the second instalment of \$25, and 210 creameries have received the full bonus. A large number of applications have been refused because the requirements have not been complied with.

SEED DIVISION.

SEED INVESTIGATION WORK.

The work of this recently organized division has been directed with a view to encourage the production and more general use of high class seeds of all kinds. Upwards of 1,200 samples of seed of grasses, clovers, cereals, root crops, vegetables and flowers were secured from seed merchants in different parts of Canada and tested in the seed laboratory. Articles containing summary information of the results from the analyses of these seeds were prepared and sent to the newspapers for general publication. Details of the results of the investigation into the conditions of the trade in timothy, alsike and red clover seeds were also published in bulletin form and freely distributed to farmers.

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EDUCATIONAL WORK.

Educational work in the matter of good seeds has been carried on through the medium of farmers' institute meetings in the various provinces. Each of forty lecturers on agricultural subjects was supplied with information regarding the seed trade, as shown by the work of the seed division, together with a chart and a collection of the weed seeds commonly found in grass and clover seeds, to assist him in the presentation of an address. A great deal of interest has been aroused by the discussion at these meetings. The subject was extremely well received, and on account of having been somewhat neglected in the past, its representation was timely and conducive to good results.

In order to further bring the advantage of using seed of the best quality to the attention of farmers, I authorized the preparation of an exhibit of seeds of various kinds and qualities, that would clearly illustrate the actual value, and the dangers that arise from the use of inferior grades. This exhibit was shown at thirteen agricultural fairs. It proved to be exceedingly instructive, and a great deal of interest was taken in it by farmers, as shown by their desire to get information relative to seeds from the officer in charge.

Compared with previous years, there has been a greater demand on the part of farmers for higher grades of grass and clover seeds, and I have been assured by several of the wholesale seedsmen that this is due mainly to the efforts of the department through the seed division.

BILL RESPECTING THE 'INSPECTION AND SALE OF SEEDS.'

Early in the year I instructed the officer in charge of this work to make a special study of the conditions of the trade in agricultural seeds, with a view to obtain further definite information that would assist me to make perfect the Bill respecting the 'Inspection and Sale of Seeds,' which I introduced in Parliament during the recent session. This Bill, with the exception of two clauses which are of minor importance, was accepted by the Committee of the Whole, and it is my intention to take it up for reconsideration early in the session of 1904. In the meantime it has been reprinted in bulletin form, together with some explanations, and distributed to farmers and seed merchants.

The object of this Bill is to place the commerce in agricultural seeds on a better and more legitimate basis. Under the present conditions of the seed trade in Canada, competition is largely confined to the matter of prices. This state of affairs is antagonistic to the best interests of farmers who produce, and merchants who endeavour to supply, the best quality of seed. There is abundant information to show that the seed trade has been an exceedingly fruitful medium for the spread of noxious weeds throughout Canada, and an endeavour is being made to suppress this evil as far as practicable. The seeds of many species of noxious weeds are very small and difficult to detect among grass, clover and other small agricultural seeds, and it has been considered wise to make provision in the Bill for the uniform grading of the principal

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grass and clover seeds sold in Canada, so that those which are represented to be of first quality will not contain the seeds of the several species of noxious weeds that are named in the Bill.

DISTRIBUTION OF REFERENCE COLLECTIONS OF WEED SEEDS.

Seed merchants, as a rule, are unable to identify the noxious impurities in the seeds they sell, and in consequence, many of the existing evils of the trade are brought about unwittingly on their part. In order to give them some material assistance with the identification of seeds, I authorized the preparation of authentic reference collections of 100 species of seeds of noxious and useful plants, for distribution to seed merchants at a nominal cost. With these reference collections in their possession, seed merchants are able to determine the species of weed seeds that are present as impurities in the seeds they sell. A large number of these collections of seeds have been supplied to Canadian seed merchants.

TESTING SEEDS FOR FARMERS AND SEED MERCHANTS.

In addition to the investigation work carried on, a large number of samples have been tested in the seed laboratory for farmers and seed merchants, who desired information regarding their purity and vitality. It is encouraging to note that the interest taken in seed testing has rapidly increased, and doubtless much benefit will arise from this work. In the seed laboratory the testing of seeds for farmers is given precedence over all other work, and a strong effort is made to have them supplied, with the least possible unnecessary delay, with detailed information regarding the seeds which they send in for analysis.

SPRING SEED FAIRS.

Early in the year the chief of the seed division completed arrangements with several agricultural societies in the eastern provinces, for the holding of annual spring seed fairs. The object of these fairs is to provide a special market day during the early spring for the sale and exchange of seeds among farmers. In a few localities in the province of Ontario these seed fairs were established several years ago, and they have proved to be an exceedingly valuable medium for farmers who desire to sell, purchase, or make an exchange of seed grain. Seed fairs were held for the first time, in the months of March and April, at Charlottetown, P.E.I.; Truro, N.S.; Woodstock, N.B.; and Sherbrooke, Que. The agricultural societies at each of these places gave prizes for the best lots of seed that were brought out in quantity for sale. The officer in charge of the seed division co-operated with the various agricultural societies in arranging the prize lists and circulating information regarding the fairs. He also awarded the prizes and delivered lectures on topics relating to seeds and kindred subjects. All the fairs were well supported, and a desire was expressed by many farmers, and by the officers of the societies, to have them continued and their usefulness extended.

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MACDONALD-ROBERTSON SEED GROWERS' ASSOCIATION.

The seed grain competition, for which Sir William C. Macdonald, of Montreal, provided cash prizes through Professor Robertson, closed with 1902. In the spring of 1903 many of the farmers who were directly interested in that competition expressed a desire to extend the work of producing high-class pure seed grain, by forming an association of seed growers, and continuing the system of growing and selecting seed grain that was adopted by the competitors in the seed grain competition. A pamphlet was issued early in March announcing the formation of the Macdonald-Robertson Seed Growers' Association, and extending an invitation to all farmers who make seed growing a special industry in their farm operations, to become members of the association. According to the rules of this association, seed grain that is pure, true to variety, and has had the benefit of careful growing and continued selection for three consecutive years, is recognized as improved seed. The advantages to be derived from organized effort on the part of seed growers are not dissimilar to the advantages which breeders of pure bred live stock get through the medium of their associations, and the general operations of this organization of seed growers will be carried on in a manner similar to those of live stock associations. It is evident that there is much need for a few farmers in every agricultural locality in Canada to make a specialty of growing high-class seed grain in quantity for sale. All farms, of various kinds and conditions of soil, are not well adapted for the production of seed of superior quality. Grain, or other seeds, intended for seed purposes, should be produced on lands that are free from noxious weeds and capable of producing those crops at their limit of perfection. It is the intention of the association to issue an annual catalogue for distribution, in which the kinds and varieties of seed produced, and the pedigree of the seed, will be published together with the names of the members of the association who produce them, the amount of each kind of seed for sale, and the market price for same. I believe that there is wide scope for exceedingly useful service for this association of seed growers, and I have authorized that the Department of Agriculture render such assistance as may enable the association to carry on efficient work.

POULTRY DIVISION.

CHICKEN-FATTENING STATIONS.

The illustration chicken-fattening stations in operation this year are located at Sandwich, Ont. ; Stanfold, Que. ; Rogersville, N.B. ; East Amherst and North East Margaree, N.S. ; and Alberton, Eldon, Glenfinnan, Montague Bridge and Mount Stewart, P.E.I. The operator of each station purchased ordinary chickens from the farmers. The chickens were fatted in lots. Each lot consisted of from two hundred to seven hundred chickens. The average gain in live weight per chicken was from one to two pounds.

In order to create a greater local demand for crate-fatted chickens, and to develop home markets, I directed that the fatted chickens be sold to produce merchants in Goderich, Bowmanville and Toronto, Ont. ; Montréal, Que.; St. John, N.B.; Amherst, Halifax, Sydney, North Sydney and Glace Bay, N.S.; and Charlottetown, P.E.I. These sales were most satisfactory, and the merchants were pleased with the increased flesh and the improved flavour of the chickens. Since the chickens that

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are fatted at the stations have been offered for sale in Canada, I notice each year an increased difference in the price per pound paid for fatted and for ordinary chickens. At the present time one Toronto firm pays five cents per pound more for crate-fatted chickens than for ordinary chickens. The result of these sales confirms my expectation that the local demand for fatted chickens will increase rapidly, and that the fattening of chickens by the farmers for local consumption can be extended with much profit.

Illustration shipments of chickens from the fattening stations have each year gone forward with success to Great Britain: commercial firms throughout Canada have exported large shipments of chickens, some of them under the direction of my department. On account of the increased local sales of fatted chickens, there will be a decrease in the number of chickens shipped from the fattening stations to Great Britain. A Manchester (England) commission merchant purchased 68 cases from my department for his Christmas trade. This merchant visited Canada about December 1st. He bought a great number of chickens and other poultry; good prices were realized. After a careful consideration of the favourable impression which crate-fatted chickens have made in Great Britain, and of the letters from large commission merchants making inquiries for thousands of similar chickens next year, it appears that the exporting of fatted chickens can be developed to an almost unlimited extent.

The style of shipping case in use at the illustration stations has been adopted by the exporting firms. The cases are made in five different sizes and hold twelve chickens weighing from two and one-half to five and one-half pounds each.

CHICKEN REARING STATIONS.

There are three illustration chicken-rearing stations in operation. They are at Chicoutimi, Que.; Andover, N.B., and Vernon River Bridge, P.E.I. The operators of these stations purchase Plymouth Rock eggs for hatching from the farmers, and illustrate the artificial methods of hatching and rearing chickens. Eggs are also supplied from utility-type Plymouth Rocks and the chickens hatched are sold to the farmers.

POULTRY BREEDING STATIONS.

The poultry breeding stations are at Holmesville and Bowmanville, Ont., and Bondville, Que. At each of these stations a model poultry house is erected and 100 utility-type Barred Plymouth Rock pullets and 10 cockerels are housed. In the winter the eggs are sold to dealers. During the breeding season the eggs are placed in incubators. A limited number of eggs are sold to the farmers at 25 cents per dozen. The chicks hatched are reared in brooders and movable houses. Valuable information was obtained regarding the hatching of the chickens, and the nature of the feed required for rapid growth.

There was a great increase in the demand for utility-type chickens. I learn that over 1,000 chickens have been sold from the three poultry breeding stations. The price per chicken was 50 cents. The chickens arrived in good condition and have given satisfaction.

The chief of the poultry division and the operators of the stations have attended and addressed agricultural fairs, institute meetings and poultry exhibitions in the different provinces. The practical information imparted in this way has proven of value.

A revised edition of ‘Profitable Poultry Farming,’ which deals with the construction of poultry houses, the work of hatching, rearing, fattening and marketing chickens, and the care of poultry, was published and circulated extensively.

EXTENSION OF MARKETS DIVISION.

EXPORTS OF CANADIAN FARM PRODUCTS.

During the past seven years Canada’s export trade in agricultural and animal products has grown at a wonderful rate. Following are the comparative figures for the years 1886, 1896, and 1903:—

Total exports of Canadian agricultural and animal products in the years ended June 30, 1886, 1896 and 1903:—

1886.....	\$ 39,718,212
1896.....	50,591,002
1903.....	114,441,863

The above figures afford striking evidence of progress; and if the ratio of increase of the past ten years is continued, the extension of markets for our farm products will each year become more important.

Although the British market now absorbs the great bulk of our exports of farm products it still offers a vast field for the further enlargement of Canadian trade.

The following comparative statement shows the value of the exports to all countries of some Canadian farm products in 1903; also the total value of the imports of similar products into Great Britain in 1902:—

Value of some Canadian Farm Products Exported in the Year ended June 30, 1903.		Value of Products of the same Sort Imported into the United Kingdom from all Countries in the Year ended December 31, 1902.	
	Dollars.		Dollars.
Butter	6,954,618	Butter.	99,902,612
Cheese....	24,712,943	Cheese	31,207,111
Eggs	1,436,130	Eggs	30,659,679
Poultry—Dressed and undressed.....	160,518	Poultry and game.....	5,154,092
Bacon, hams and pork.....	16,029,269	Bacon, hams and pork....	92,650,146
Wheat.....	24,566,703	Wheat.....	131,682,505
Flour	4,699,143	Flour.....	43,545,701
Oats	2,583,151	Oats.....	24,534,429
Oatmeal.....	537,002	Oatmeal.....	2,365,521
Pease.. ..	1,052,743	Pease.. ..	3,247,215
Barley	457,233	Barley... ..	34,704,161
Hay	3,595,665	Hay	6,618,415
Cattle.....	11,342,632	Cattle.....	38,031,797
Sheep and lambs.	1,655,681	Sheep ,.....	2,211,520
Apples—Green or ripe ..	2,758,724	Apples— Green or ripe..	9,360,946
Total... ..	102,542,155	Total	555,875,850

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Taking the fifteen classes of products given in the above table, it will be seen that, in her biggest year, Canada supplied less than one-fifth of Great Britain's requirements. The above figures illustrate the enormous demands of the British market and the small share, relatively, yet secured for Canadian products. To obtain a larger share of this market it will be necessary to pay careful attention to the following points: Superiority in quality; regularity in supply; ability to sell at as low a price as competing countries; and the use of attractive packages of the kind demanded by the market.

Apart from Great Britain, the other markets most promising are South Africa, Japan, China and the British West Indies.

Since the establishment of a direct steamship service between Canada and South Africa a very encouraging trade has been developed. Each monthly steamer carries large shipments of grain, flour, provisions, &c., and, as soon as the commercial depression engendered by the war and still felt in South Africa, is removed, Canadian exporters of foodstuffs will be in a good position to share in the expansion of that market.

Hard wheat flour is the principal agricultural product exported from Canada to Japan, and this trade has been stimulated by the practical and successful exhibit of Canadian flours made by my department at the Osaka exhibition, early in 1903. In the last year there has also been a notable increase in the exports of Canadian butter to both Japan and China—mainly from the creameries operated by my department in Alberta. The butter is mostly packed in tins, a proportion, however, going forward in 14 and 28 pound boxes.

The British West Indies furnish a market of considerable importance for Canadian food products, especially for flour. Recently a paragraph appeared in the Canadian and British press to the effect that Canadian flour had a bad reputation in the West Indian market, owing to its poor keeping qualities. I caused this statement to be inquired into, and found that, as far as the leading brands of Canadian flour are concerned, it was entirely unfounded. Undoubtedly some Canadian shipments have been complained of, but the flour was usually the product of small mills and had been manufactured and packed without regard to the special requirements of the West Indian markets.

VARIOUS FOOD PRODUCTS.

Our exports of cheese have received a great impetus in the past few years, and Canadian Cheddars are steadily gaining in favour in the British markets. For the year ended June 30, 1903, our exports were the largest in our history; but the current year promises an even better showing, the value of the exports of cheese for the months of July, August and September, 1903, being \$10,327,439, against \$8,376,940, for the three corresponding months in 1902.

A good deal has been done in recent years to improve the transportation facilities for our export butter trade, so that to-day Canadian butter is carried in cold storage from the time it leaves the creamery until it reaches the British docks. To reap the full advantage of our chain of cold storage transportation it is apparent that the butter should go into cold storage as soon as it is landed in Great Britain. Instead of this, however, it is often allowed to remain on the quays at Liverpool and Glasgow for

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several days, greatly to its detriment. In one case eleven days elapsed before a shipment of Canadian butter was removed from the Glasgow docks. Lists showing the landing and delivery dates of butter ex Montreal steamers at the above named ports, have been compiled and laid before the produce associations of Montreal, Liverpool and Glasgow. The matter has also been ventilated in the Canadian and English trade papers, and the British importers urged to take delivery of Canadian butter as soon as discharged from the steamers.

Shipments to England of Canadian butter packed in casks (the Danish kiel) have been a feature of the export trade this year. Usually there were no marks or brands on the casks, but in one shipment the packages were marked with a Danish name. This lot was stopped by the British Customs authorities until the name was erased. The butter shipped in casks was generally of fine quality and doubtless ultimately reached the British consumer in the guise of 'Choicest Danish.' While this practice is not to be commended, it is a tribute to the quality of Canadian butter, when consumers in Britain are unable to distinguish between the Canadian and the Danish article if both are put up in the same style of package.

Canadian apples have easily taken first place in the British markets this year, and have realized good prices.

THE FRUIT DIVISION.

The Fruit Marks Act has grown steadily in popular favour as its provisions become better known, and it is generally accepted as having been a most beneficial piece of legislation. This is evidenced by frequent press references, and by the expressed opinions of leaders in the trade; while the fact that the Fruit Growers' Associations of Ontario and Nova Scotia have suggested no amendments, shows that the present Act is fairly satisfactory to the producers. There have been some requests for a statutory definition of the second quality of fruit, the Act, as it now stands, defining only the first grade.

The work of inspection continues to show excellent results in improving grading and packing, and the greater reliance which the trade are now able to place on the marking of the packages. The inspection at ports of export has been of material assistance to shippers. They have been advised of careless work on the part of their packers, of defects in packages or in the carrying quality of the fruit. These advices have enabled them subsequently to avoid similar mistakes and losses.

The inspectors, moreover, have kept a close watch on the handling of fruit from cars to steamers; and have successfully urged upon those in charge the adoption of improved methods of handling and stowing the packages.

In the matter of small fruit in baskets, an effort has been made, with some success, to induce private citizens to avail themselves of the protection afforded by the Fruit Marks Act, by prosecuting sellers of fraudulently packed fruit, without relying upon an inspector. Market inspectors, appointed by municipalities, have also instituted successful proceedings under the Act, with marked effect.

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During the spring and early summer, the inspectors were engaged in holding orchard meetings, where all branches of practical fruit-growing were discussed, and demonstrations given in pruning, grafting and spraying.

Fall fairs were attended so far as inspection work permitted, and the subject of packing and packages was discussed with growers, practical illustrations being given. A special exhibit was made by the fruit division at the Dominion exhibition in Toronto, where many kinds of pear and apple packages were shown, and their merits discussed.

The fruit inspectors again assisted the Provincial Farmers' Institutes at their winter meetings, with gratifying results in the matter of attendance and interest.

The evidence of the chief of the fruit division, as given before the Select Standing Committee on Agriculture and Colonization, dealt chiefly with the export trade, and with the requirements of British markets, giving the results of his investigations in the United Kingdom last year. This evidence was printed by order of Parliament, and has been widely distributed.

Bulletins were also issued dealing with the export apple trade and export pear trade, respectively, and including a copy of the Fruit Marks Act.

To encourage more general and efficient spraying by small growers, a number of orchards were sprayed throughout the season by means of a power outfit, operated by gasoline, under the direction of the fruit division, the growers paying rather less than the actual cost of the operation. Exceptionally good results were obtained, and the advantages of co-operative power spraying were demonstrated.

A serious drawback, however, in our export apple trade is the large number of varieties sent forward in each shipment. Canadian orchards are planted with too many varieties, and our growers are suffering financially in consequence. Consignments of one well known variety, of uniform grade, are wanted by the large dealers in Great Britain, while small lots composed of different varieties and grades are bought by small dealers at reduced prices.

Canadian eggs have now an excellent reputation in Great Britain. This year our exports to that market included several shipments of tinned eggs, which I understand turned out satisfactorily. A good market exists in South Africa for tinned eggs, and Canadian exporters should endeavour to secure a portion of this trade, now being supplied from Russia, Germany and Denmark.

INSPECTORS AT PORTS.

Four inspectors were again appointed at Montreal, for the season of navigation, to observe and report concerning the condition of Canadian food products when loaded on the steamers, the handling on the wharfs and in process of loading, and the stowage in the ships. During the season they furnished detailed reports of the shipments of cheese, butter, eggs, bacon, poultry, fruit, &c., forwarded in 291 sailings of steamers, as follows:—

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For Liverpool..	82 sailings.
“ London..	64 “
“ Glasgow	63 “
“ Bristol..	39 “
“ Manchester..	24 “
“ Leith..	11 “
“ Cardiff..	8 “
<hr/>	
Total..	291 “

A feature apt to be overlooked, in connection with the work of these cargo inspectors, is the check their presence entails on rough handling by the carters, or the stevedore’s men. The handling of the cargo from the time it is brought into the sheds until it is stowed in the holds of the ship, is done under the eyes of one of the department’s inspectors; and should he find, say apples or cheese being handled by a carter or ship’s labourer in a rough, careless manner, he cautions the man, and if the warning is not sufficient, he reports him to the ship’s agents, which action always effects the desired reform. A word of warning, however, is usually sufficient, as the inspectors are now well known and their official standing generally recognized.

Officers of the department are also stationed at Liverpool, Manchester, London, Bristol and Glasgow. They are instructed to observe carefully the handling of perishable products in the unloading of the steamers, and to report fully to the department. They are also instructed to do everything possible that will make for improvement in the safe discharge of cargo, and to advise the officials of the steamship lines of any rough work that may come under their notice. When their reports to the department indicate, as they too often do, a lack of care in the packing of some particular shipment, the inspector’s remarks are transmitted to the shipper for his information. Should, however, a report show that perishable goods have been landed in a damaged condition, due to causes controlled by the steamship people, the department at once communicates with the line concerned and endeavours to have them remedy the matter forthwith. Continuous efforts are thus being put forth by the department to better existing transportation conditions, and a great deal of correspondence is necessarily exchanged with the steamship companies in this connection. Last season, owing mainly to representations by the department, several steamers carrying apples were fitted with additional ventilating trunks in the ordinary holds, and minor improvements were also effected in the cold storage chambers carrying tender fruit.

LIVE STOCK DIVISION.

During the past year, the efforts of the live stock division have been devoted to the prosecution and extension of those lines of agricultural progress that had already been begun; namely: sales of pure bred stock; extension of the Farmers’ Institute system; the improvement of agricultural exhibitions, by extending the system of expert judging, the discouragement of attractions that are non-educational in character, and the introduction of features that are essentially educative; the publication of

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press articles, and the preparation of bulletins. A bulletin on the swine industry in Canada is now prepared and ready for the press.

BRITISH COLUMBIA.

In British Columbia live stock judges were again furnished for all the fairs. These report steady progress and increasing appreciation of the system of expert judging. After the fair season was over, the judges assisted in conducting a series of institute meetings covering the greater part of the farming and ranching district of British Columbia. In all, 54 very successful meetings were held. The speakers report that the attendance was very gratifying and that lively and profitable discussions followed the addresses delivered.

NORTH-WEST TERRITORIES.

The work in the North-west Territories was similar to that done in British Columbia and the other provinces. Judges were sent to a number of the exhibitions and after the fair season was over, these men remained for a time and conducted a series of institute meetings. A very successful auction sale was held at Calgary in connection with the territorial live stock associations; 268 animals were sold at very satisfactory prices, averaging \$96.38. A stallion and cattle show was held in connection with the sale, which brought out a fine exhibit of stock; and the live stock conventions which were addressed by the judges, were attended by large audiences of interested and appreciative stockmen.

MANITOBA.

In Manitoba the work has been systematized by the appointment of Mr. George H. Greig of Winnipeg, as secretary of the Live Stock Associations, and representative of this division in that province. Mr. Greig is thoroughly acquainted with the needs and conditions of the west, and is in close touch with all the forces that make for progressive agriculture. He is devoting all his time to the live stock interests and farmers' institutes, and is doing very effective work.

During the month of February, two short courses in live stock judging were held at Winnipeg and Brandon under Mr. Greig's direction. Expert judges were furnished by the live stock division, who not only conducted the classes in judging, but also gave addresses on various subjects of interest to live stock men. These classes were largely attended and the keenest interest was manifested in the proceedings throughout.

The live stock associations of the province have been placed on a better working basis, and the constitutions revised to bring them into conformity with the live stock associations of the other provinces.

ONTARIO.

In Ontario the work in connection with the live stock associations and farmers' institutes is so well organized and in such good hands that it has not been found ne-

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cessary to render very much assistance from this division except to strengthen the hands of the officers of the provincial department of agriculture.

Under the joint auspices of the Dominion Live Stock Associations and this division, an auction sale of pure-bred stock was held in Guelph. This sale was a pronounced success; in all, 77 animals were sold at prices ranging from \$35 to \$275, averaging \$83.58. Another sale was conducted in Ottawa at which 25 animals were sold at prices ranging from \$37 to \$150, an average of \$107.88.

The principle of public auction sales inaugurated by this division has been so successful that it is now being copied on quite an extensive scale by the breeders themselves. Noting the success of the sales at Guelph and Ottawa, a number of the breeders of Ontario conducted a combination sale in March, 1903, in Ottawa, at which 41 animals were sold at prices ranging from \$35 to \$175, an average of \$99.32. The lowest price named, was for a bull calf of less than two months old. Several other sales have been held at Campbellcroft, Guelph, Port Perry, and elsewhere, by private enterprise; all of which have been satisfactory and mark a step in advance of old time methods of the disposal of surplus stock.

With the assistance of the live stock commissioner, 'model fairs' were again conducted at Whitby and Richmond. From these fairs, everything that was non-educational in character was eliminated, and in every particular they were made to conform to modern ideals of what an agricultural fair ought to be. Expert judges were furnished for each department of the fair. These men explained the reasons for their awards, and, when time and circumstances would permit, pointed out and commented on some of the excellencies and defects of, at least, a few of the exhibits in each class. This method has given the best of satisfaction both to the exhibitors and to the spectators.

Illustration plots were again arranged in which were grown a number of the most promising varieties of corn, clover, grass, fodder crops, mangolds, turnips, sugar beets, &c. This feature of the fair attracted much attention and proved to be both interesting and instructive.

By way of attraction, encouragement was given to good, clean, amateur, athletic sports of various kinds. In this connection a gymkhana was held at Whitby, which proved to be a very amusing and interesting novelty with all of the desirable and none of the deplorable features of the usual horse racing, which it was designed to displace.

The desirability of interesting the children in the agricultural fair system has not been overlooked. With this in view prizes were offered at several fairs to the teachers and pupils of a public school section making the best exhibit of (1) cut flowers grown in the school grounds; (2) grain in straw; (3) clover and grasses; (4) roots, fruits and vegetables; (5) wild flowers and leaves of trees; (6) weeds and weed seeds (7) beneficial and injurious insects; (8) native woods. This plan has proved effective in inducing the children to begin the fascinating study of nature, directed towards the elements of general agriculture, economic botany and entomology.

This division has had many gratifying expressions of approval both from teachers and parents of children that have taken part in an exhibit of this kind. Nothing else

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stimulates to effort like the prospect of competition. Children are in this way incited to take up, with enthusiasm, interest, and pleasure, the study of the open book of nature, with all its attendant advantages.

QUEBEC.

Fifteen speakers were sent out by this division who addressed a series of 98 institute meetings in the province of Quebec. These meetings were well attended and provoked lively discussions, and were in every respect much in advance of anything that has heretofore been done in this direction in the province.

Expert judges were sent to four of the leading fairs in the province and were well received. Here, as elsewhere, the system of sending expert judges who give the reasons for their awards, is growing in favour.

Steps are being taken to organize the live stock men of Quebec on the same basis as the live stock associations of Ontario. This movement is meeting with the hearty approval of the leading stock breeders of the province.

NEW BRUNSWICK.

Judges were again sent by this division to some of the principal fairs of the province. The live stock commissioner was unable to supply judges for all the societies that asked for them. The demand has been so great from the various provinces that it has been exceedingly difficult to find enough competent men to do the work.

Three men were sent to New Brunswick to assist in farmers' institute work. These men addressed 105 meetings, and report that the meetings were well attended, and that a growing interest in farmers' institute work was manifested. A number of speakers were also furnished for the annual convention of the New Brunswick Farmers' and Dairymen's Association, which met at Woodstock, on January 26, 27 and 28, and at Sussex on January 29 and 30.

NOVA SCOTIA.

A winter fair was conducted at Amherst in December on similar lines to that at Guelph. Judges were sent by this division and addresses were given on various topics of interest to live stock men. This fair was an unqualified success and a marked improvement on the one held two years ago. The live stock men of the province are taking the matter up with enthusiasm and zeal and the attendance was so large that the commodious building provided by the town of Amherst at a cost of \$13,000 was crowded to its limit.

Farmers' institute work also has been conducted in Nova Scotia with marked success. The results of the advocacy of better methods through farmers' institutes and other channels, has been to awaken a lively interest in improved agriculture, and especially in the keeping of more and better live stock. Men that were openly hostile two years ago to any advance along the lines of live stock associations and farmers' institute development are now expressing themselves as in hearty sympathy with the movement, and are lending a willing hand to push the work along.

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PRINCE EDWARD ISLAND.

Judges were sent to the provincial exhibition at Charlottetown. Speakers were also sent to assist in conducting a series of institute meetings throughout the province. Twenty-eight very successful meetings were held with an average attendance of 70. Prof. MacMillan, of Charlottetown, the provincial secretary of agriculture, expresses himself as highly gratified with the success of the meetings, and says:—‘The majority present were representative men, who manifested a close interest in the subjects under discussion. No time was taken up with light entertainment of any kind, and much good work was done.’

EXPERIMENTAL FARMS BRANCH.

The experimental farms continue to form one of the important branches of the work conducted by my department. Their influence is far-reaching and the benefits they confer, by giving assistance and helpful information on every hand to those engaged in agriculture and horticulture, are felt and appreciated in all parts of the Dominion. The experiments and investigations conducted in all the divisions of this work are so arranged as to have a practical bearing on farming affairs, and the experience gained is widely distributed, in the Annual Reports and Bulletins, among those who are engaged in developing the agricultural resources of the Dominion. These publications are full of valuable information and, under my instruction, are sent to all who apply for them. Gratifying testimony as to their value and usefulness comes from every section of the country, and many farmers attribute a large measure of their success to the practical information which has been thus supplied to them. The very large and constantly increasing correspondence conducted by the officers of the experimental farms with farmers seeking advice and information, has also been productive of much good. Those who have participated in these and other benefits conferred by these institutions have become much interested in the work carried on at the farms and value the records of this work in the publications issued, very highly.

The examples given by the experimental farms in methods of cultivation of the land, its treatment to regulate and influence soil moisture, in rotation of crops, in demonstrations regarding varieties of grain and other important farm crops most profitable to grow, and of fruits best adapted to the varying climates of different parts of Canada, are all exceedingly helpful and serve to awaken thought and encourage enterprise among farmers everywhere.

CO-OPERATIVE EXPERIMENTS AMONG FARMERS.

The large annual distribution of samples of grain for the general improvement of farm crops has been continued. These wide-spread co-operative tests, in which about forty thousand farmers throughout the Dominion are annually engaged, have an educating and stimulating influence on the community and result in much benefit to the country. Under my instruction, the weight of the samples of oats sent out has been increased to four pounds, and those of barley and wheat to five pounds each, which is sufficient to sow one-twentieth of an acre in each case. In the returns given by the

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farmers of the results of their tests, the quantity now supplied enables them to give the yields of the several crops per acre, information most useful to all concerned.

The magnitude of this work is perhaps not fully and generally understood. Last year the total number of samples distributed was over forty thousand, involving the use of about seventy tons of the choicest and purest seed obtainable. The greatest care is taken to have this seed true to name and thoroughly clean, and many grateful acknowledgments are received from farmers every year of the benefits conferred on them by this distribution. In many instances, with tests of the more prolific sorts of oats, the twentieth of an acre has produced from four to five bushels, and this quantity, sown the following season on from two to two and a half acres of land, has, in some instances reported, given the experimenter 200 bushels or more, sufficient to sow thereafter a considerable acreage for himself and provide a surplus to sell to his neighbours, and all at no cost to himself beyond that of his own labour.

With the great influx of new settlers in the country, who have much to learn, the helpful influence of such work is impossible to estimate. By the pursuit of this method the best and most productive varieties of the more important farm crops find their way into the remotest corners of the Dominion, producing bountiful returns. Evidence of the good effect of this work is found in the increase of the average production of grain from year to year in the different sections of the Dominion. This improvement in average yield is particularly noticeable in oats, which have now become the most important grain crop in the eastern provinces. The extensive use of this valued cereal has had an important influence in building up the trade in fat cattle and swine as well as in the extension of the dairy and poultry industries.

MAINTAINING THE FERTILITY OF THE SOIL.

The experiments carried on in the ploughing under of clover, as a fertilizer for the soil, have produced in almost every instance such marked improvements in succeeding crops that intelligent farmers in many districts have followed the example of the farms in this respect, with much profit. The tests, began many years ago to gain information as to the relative influence of the application of natural and artificial fertilizers on the more important farm crops, have been continued and many useful lessons have been learned in this connection. The problems connected with the maintaining of the fertility of the land lie at the very foundation of successful agriculture, and are among the most important which can engage our attention. Much thought and care have been bestowed in working out for the guidance of farmers the most economical and practical methods to adopt to secure this end.

THE BREEDING OF NEW CEREALS.

Some excellent results have been obtained in connection with the cross-breeding of cereals, in the production of earlier maturing varieties of high quality, which it is hoped will extend the area of wheat-growing in Canada and permit of the profitable growth of this important cereal in some districts where, owing to the shortness of the

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season, it has heretofore been an uncertain crop. In this field of labour the outlook seems full of promise, and under my instruction the work is being extended. A new division has been organized of cereal breeding and experimentation, which will result in a considerable enlargement of this important branch of work, from which we may look for increased benefits in the future.

THE BREEDING OF HARDY APPLES FOR THE NORTH-WEST.

Satisfactory progress has been made in the cross-breeding of hardy apples for North-west country. Several of the new sorts which have fruited for the first time this year, are superior in size and quality to any heretofore grown. The results thus far achieved point to an early solution of the problem of providing apples hardy enough to endure the climate in most of the settled portions of the Dominion, and of such size and quality as to be useful for all domestic purposes.

Fuller particulars along these lines will be found in the Annual Report of the Experimental Farms, which forms an Appendix to my Report.

DIVISION OF AGRICULTURE AND LIVE STOCK.

In the agricultural division the work carried on during the past year has been along the lines of (a) Study of methods of soil cultivation and (b) Study of comparative values of different crops as food producers for cattle, sheep, and swine.

The soil.—The work in soil improvement has been along the lines of cultivation and of rotations of such character as to improve the physical condition and increase the humus content of the fields handled. Shallow, early fall ploughing with deep cultivation is being compared with deep late fall ploughing and shallow cultivation.

Information of great value is being secured along this line and is being disseminated by means of bulletins, reports, and addresses among the farmers of Canada.

Crops.—The field crops possible of cultivation in Canada are grown and a study of the cost of production of the same and of their comparative economic value as food producers is being made.

ANIMAL HUSBANDRY.

Dairy cattle, beef cattle, steers, sheep and swine are bred and fed to a considerable extent.

They are used to determine both the comparative value of animals of different types and breeding as well as the value of different forage plants for the production of milk or flesh.

Dairy Cattle.—Herds of pure bred Ayrshire, Canadians, Guernseys and Short-horns as well as small grade herds of each breed are being fed under similar conditions to gain some information as to the comparative value of cattle of the characteristics well known to be possessed by the breeds above mentioned, as milk producers or dual purpose cattle.

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A record of the year's work with these herds may be found in the report of the Experimental Farms for 1903.

Steers.—The study of the comparative economy of feeding three-year-olds, yearlings or calves for beef production, as well as the comparative study of the feeding of steers loose *vs.* tied is being continued.

Swine.—Economical production of firm bacon continues to be the aim of all experimental work with swine : roots and different kinds of pasture are being tried and different methods of preparation of food as well as the value of different rations inquired into.

Sheep.—Leicesters and Shropshires are the breeds kept. The lamb crop was good in the spring, but owing to the drought in May and June the young progeny did not all develop into first-class animals.

DIVISION OF HORTICULTURE.

Most of the important experiments which have been conducted in the horticultural division during recent years were continued this season, as it is believed that the value of results of an experiment is increased the oftener the experiment is repeated. Some new and interesting experiments were also begun.

Large Fruits.—The sixteen years' experiments with large fruits at the experimental farm have furnished a vast amount of information regarding varieties and their methods of cultivation, and the publishing of the results obtained has done much to encourage fruit growing, especially apple culture, in the provinces of Ontario and Quebec.

Apples.—Although the apple crop on the experimental farm was not as large this year as last, the fruit was of good quality and a large number of varieties have borne fruit. Every year there is a large proportion of varieties fruiting which have originated in Canada, and it is the aim of the horticulturist to test all the promising seedlings which come under his notice, in the hope of obtaining some better and hardier kinds than those already on the market, and some of the seedlings which have fruited are very promising. A large number of seedlings of the best hardy varieties raised on the central farm have also been planted, and the first fruits were obtained this year.

Plums.—It has been well proven that the European plums, as a whole, are not satisfactory at Ottawa, as the flower buds are usually killed in winter and it is rarely that a good crop is produced. Canadian seedlings are, however, being tested which are hardier in this respect. Much attention is also being paid to the improvement of the native and American plums. A large number of varieties fruited this season. During the year a bulletin on plums was published, in which lists and descriptions of varieties and methods of culture were given.

Cherries, Pears, and Peaches.—None of these fruits have been satisfactory at Ottawa. The flower buds of cherries are destroyed in winter; pear trees are killed by blight, and the wood of peaches is killed back. It has been found that some of the low growing Russian cherries will produce fruit, as the buds are protected with snow.

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Seedlings of these cherries are now being grown in the hope of getting some trees that are still hardier. Seedlings of the most blight-resistant pears are also being grown, and peach trees are being raised from varieties which ripened in the open at Lachine Locks, Que., and Orillia, Ont.

Grapes.—It was a very favourable autumn for ripening grapes, and a large number of varieties matured thoroughly.

Strawberries.—The strawberry crop was lessened very materially by spring frosts and by drought. Very useful information, however, was obtained regarding the relative hardiness of the different varieties when in flower, as some suffered much more from frost than others.

Raspberries and Currants.—Produced fair crops.

Individuality of Fruits.—The crop of fruit from each individual tree at the Central Experimental Farm is recorded every year, in order that one may tell at the end of a number of years just what each tree has borne. It has been found that there is a great variation in yield from trees of the same variety planted at the same time and under the same conditions. On tabulating five years' records, it was found that some trees had yielded from two to four times as much fruit as others of the same age. A co-operative experiment was planned in order to get fruit growers to investigate this matter for themselves, and a number have joined in the experiment. It is hoped that by propagating from the most productive trees a more productive strain will be obtained. Trees have been propagated at the experimental farm to determine this.

Growing Vegetables under an inclosure Covered by Cheesecloth.—An experiment was conducted this year by growing vegetables in a cheesecloth inclosure to determine what effect it would have upon them as regards earliness, tenderness, productiveness, &c. Owing to the unusually wet and cool summer, the test was not as satisfactory as it might otherwise have been. A few points, however, were determined, of which the following may prove very useful to market gardeners. It was found that radish and cauliflower inside the inclosure were not affected with the root maggot, while those outside were badly affected and the radish rendered almost entirely worthless. If maggots can be prevented from doing injury economically in this way it will mean much to those who grow radish, cauliflower and probably onions.

Many additions were made to the trees, shrubs and herbaceous plants in the arboretum and botanic garden this year, and additional information was obtained regarding the hardiness of those growing there. Some further planting was done in the forest belts, where certain kinds of trees had failed; close planting being adopted with the object of lessening the labour required to keep the trees from weeds and growing thriftily.

DIVISION OF ENTOMOLOGY AND BOTANY.

The work of this division has been steadily increasing in a satisfactory manner. The large number of new settlers in the west find in their new homes many subjects concerning which they can obtain useful information from the entomologist and botanist. Inquiries concerning native plants and their suitability for fodder or medicine,

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and also as to their being a cause of possible danger in poisoning stock have been frequent. This is probably an outcome of the lectures upon weeds and poisonous plants which have been delivered in the west by the entomologist and botanist for the territorial department of agriculture during the past four seasons.

The practical study of entomology, or investigations into the life histories of useful and injurious insects, is one of the chief objects kept in view by the officers of this division, and effective work has been done in this direction. The entomologist was honoured last spring with an invitation to deliver a series of lectures upon economic entomology at Cornell University, Ithaca, N.Y. This was owing to the illness of the regular lecturer. Unfortunately, on account of the great pressure of the work in the division, this offer had of necessity to be declined.

At the request of the department of agriculture for the North-west Territories and of that for British Columbia, I was pleased to arrange for the entomologist and botanist to deliver addresses at series of meetings held during the summer along the Qu'Appelle valley and in Alberta, and later on Vancouver Island, in the Fraser valley, and in the Kootenay and Boundary country, B.C.

The entomologist and botanist has also, when his absence from Ottawa was possible, assisted at various meetings of farmers' institutes, exhibitions, fairs, &c., in eastern Canada, and his addresses have been listened to with satisfaction and profit, as witnessed by appreciative letters I have received from the localities visited.

The investigation of fodder plants of all kinds has been continued and experiments carried on to discover the suitability of grasses, legumes, &c., under different conditions of soil and climate in various parts of the Dominion. All the fodder plants recently introduced have been tested, and a great deal of useful information has been given to correspondents.

The collections of plants in the herbarium at the Central Experimental Farm, and of insects in the cabinets, have been largely increased during the past year, and are now valuable sources of reference for students, of which many avail themselves.

Much attention has been given to building up the collection of weed seeds in the division, and this collection now contains samples of nearly all the worst agricultural weeds of the country, and arranged in one-ounce bottles with metal screw-tops. These are convenient for reference.

The subject of weeds is one of which the importance has been much recognized of late, and the services of the entomologist and botanist have been made use of to a considerable extent in naming specimens and collections of weeds and their seeds, sent for identification; he has also acted as a judge at some of the autumn exhibitions, and has taken an active part in the recent and important Nature Study movement, in this connection delivering several addresses before teachers' associations and at farmers' meetings.

Among insects which have demanded special attention during 1903, mention may be made of the following :

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San José Scale.—It is to be regretted that during the past season, although this rightly dreaded pest of the fruit grower, has not spread much into new districts, there has been a decided increase in the losses due to its attacks within the already infested area. The treatment, which up to the present time has given the best results, is to spray affected trees in winter with the well-known California wash of lime, sulphur and salt, or with modifications thereof, and in summer with the ordinary kerosene emulsion wash. If these recommendations are adopted regularly by fruit growers, trees can be kept clear of the San José Scale and good crops grown; but the treatment must be repeated every year without fail.

The Oyster-shell Bark-louse.—The ordinary bark-louse of the apple, which occurs wherever apple trees are grown, has as usual caused much loss. This insect can be controlled with comparative ease by means of the sprays recommended for the San José Scale and by spraying the trees during winter with a lime wash.

Plant-lice on fruit trees.—Several kinds of these insects occurred in numbers in different parts of Canada. The Apple-Aphis was abundant in bearing apple orchards, during the spring, and was the cause of some anxiety, though little injury resulted; the severest attacks were upon nursery stock, particularly upon such as was grown from buds or for budding. The Cherry Aphis appeared in large numbers on sweet cherries in western Ontario, but was in most places destroyed by its natural parasites before the crop had suffered seriously. The Pear-tree Flea-louse was exceedingly abundant and injurious in some pear orchards in western Ontario, and specimens were also received for the first time this year from Nova Scotia.

Grain crops throughout the Dominion were freer than usual from insect attacks. The Hessian Fly was notably less abundant than in former years. The Wheat-stem Maggot was only complained of in a few restricted localities. In Manitoba some loss occurred from locusts; but the provincial Minister of Agriculture promptly attended to the matter and distributed poison to all who applied; this was used most successfully in destroying the insects, the application made being the Criddle mixture, which has been strongly recommended in the recent reports of the entomologist. A widespread but not very important injury was observed in many places in the oat crop, which was caused by a minute insect belonging to the Thripidae, that attacked the cvules of the forming grain, making it turn white without developing. The insect has not appeared for many years. The remedies recommended were the burning over of stubble and deep ploughing. The Grain Aphis, which occurred in large numbers in many places and attracted much attention, did comparatively little harm, considering its enormous abundance. The Pea Weevil was notably less destructive in 1903 than for many years past; it is thought that this improvement is due to many farmers and seed growers having adopted the remedies recommended.

Forest and shade trees were not reported to have suffered seriously from insect enemies during the past season. The Forest Tent Caterpillar was hardly complained of; but the Fall Webworm is decidedly on the increase in many parts of Canada, and fruit growers and municipal authorities will do well to attend to this insect before it makes too great headway. The same may be said of the White-spotted Tussock-moth, which is disfiguring many of the shade trees in Montreal, Toronto and other cities.

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The Horn Fly has been very troublesome in some districts; specimens were observed in the North-west Territories, and the insect was found to be annoying dairy herds to an injurious extent in Vancouver Island during the past summer.

DIVISION OF CHEMISTRY.

As far as practicable, assistance of a chemical nature has been given to all the more important branches of agriculture, dairying, stock feeding, fruit growing, bee keeping, &c., by instituting special investigations, by the examination and analysis of soils, cattle foods, well waters, &c., forwarded by or procured from farmers and others, as well as by correspondence and addresses at conventions. The more important of these investigations and researches may be indicated as follows:—

Dairying.—Complete analyses have been made of about 150 butters made by an expert under known conditions of temperature, &c. This work was undertaken to ascertain the effect of certain factors or conditions of manufacture upon the composition of butter, and more especially upon its water content. The results will show to what extent the degree of ripeness of the cream, the churning temperature, the temperature of the wash-water, the rate of salting, the period or length of time between salting and working, &c., affect the butter, and thus furnish information that may lead to a greater uniformity in this valuable dairy product.

The nutritive value of certain concentrated feed stuffs, manufactured or sold in Canada, has been determined. In addition to various milling and other by-products, such as gluten meals and feeds, cotton seed meals, &c., a considerable number of brans and shorts from Canadian mills have been analysed. The report of this division for the current year furnishes much useful information on these matters, both for the dairyman and the feeder.

Fruit Growing.—Continuing the work upon the problem of soil-moisture conservation in orchards, data have been obtained this year emphasizing the value of cultivation and the preservation of an earth mulch to retard surface evaporation.

The fertilizing value of certain cover crops, such as the Hairy Vetch, Horse Bean, and Soja Bean has been determined, and the importance of such leguminous crops for the enrichment and general improvement of orchard soils indicated.

Certain newly introduced insecticides and fungicides have been critically examined, such as KNO Bug, Bug Finish, &c., and their merits for the prevention or protection from insect pests, reported upon.

Beet Sugar Industry.—The richness of sugar beets, grown in the various provinces of the Dominion, determined from beets grown on the various branch experimental farms and at other localities during the past year, has been determined. The information obtained from this yearly examination is eagerly sought for by those who are already growing beets for the factories, or who are considering the advisability of doing so.

Bee-keeping.—The researches in this connection during the past year have included the following: (1) the best conditions under which to store extracted and comb

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honey; (2) an examination into the nature of (so-called) aphidian honey; (3) the making of honey vinegar, and (4) the detection of beeswax adulterants.

Waters.—Well waters from farm homesteads and from creameries and cheese factories have been tested as to their purity. These included samples received from all the provinces, and it is confidently hoped that the results of this examination may be largely instrumental in exciting a keener interest in the matter of a pure water supply throughout the country generally.

Chicken fattening.—Incidental to the question of the relative digestibility of certain foods by poultry, certain results have been obtained as to the fattening properties of these foods, which will be found interesting and valuable to those preparing chickens for the home or English market.

DIVISION OF CEREAL BREEDING AND EXPERIMENTATION.

The work of this division has been, until recently, under the personal charge of the director who has succeeded in establishing a wide reputation for the Dominion Experimental Farms, both at home and abroad, by producing and by introducing to general cultivation new and valuable sorts of cereals of good quality and highly productive. For several years past, however, owing to the increased demand on his time from other branches of the work, the director had found it impossible to give to this division the large amount of personal attention which its great importance demanded. The work has, therefore, been put in the charge of a special officer, who devotes his whole time to it.

The investigations carried on in this division fall chiefly into two sections, (a) cereal breeding and (b) comparative tests of varieties of grain, field roots, &c.

Cereal breeding.—The constant demand for improved varieties of grain suitable for the varied climates of the Dominion, and especially for early ripening sorts adapted to the northern sections of the country (where settlement is now going on with increasing rapidity) is being met as far as possible by an extensive series of experiments in the cross breeding of various types of wheat (possessing those qualities which it is desirable to combine) and also of oats, barley and pease. The past season has been singularly favourable for this work, and a large number of interesting crosses have been made. In addition to this, considerable attention is being paid to the selection of the most promising strains to be found among the cross-bred varieties produced in past years at the experimental farms.

In the case of wheat, special pains are being taken to ascertain by careful study and analysis which varieties will produce flour of the best quality; so that the high reputation of Canadian wheat may be fully maintained in the future. Actual milling tests are also obtained in the case of some of the new sorts which are attracting general attention. Quality, earliness, productiveness and ability to resist rust are the characteristics looked for in the new varieties of wheat.

Somewhat similar work is also being carried on in the crossing and selection of varieties of oats, barley and pease.

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Comparative tests of varieties.—The standard and new varieties of cereals, field roots, &c., offered to the public by seedsmen are grown in plots side by side under similar conditions, for the purpose of ascertaining their relative productiveness, earliness, &c. The new varieties produced at the experimental farms are also subjected to the same test. Interesting and important information is thus acquired each year. Over four hundred of these plots were grown during the past season.

Considerable time has been spent in this division in the establishment of a reference collection of varieties of cereals, which has already proved of great utility.

Researches have also been commenced looking to the solution of some interesting questions in regard to the variation in the proportion of husk present in different varieties of oats, barley, spelt and emmer.

POULTRY DIVISION.

In the poultry department experimental work has been carried on calculated to be of direct service to the farmers of the country. That poultry keeping is being recognized as a paying branch of farm work is shown by increased inquiry by farmers—particularly during the past year—as to breeds of fowls most suitable to them, and their management. In order to have the best results it is necessary that farmers should keep such varieties of fowls as will be good layers of eggs in winter and produce such chickens, during the summer months, as will make the superior quality of poultry flesh, as quickly as possible, so making them remunerative all the year round. Experimental work extending over many years and published in the shape of annual reports, gives such information as is likely to bring about desirable results.

During the past year experiments have been continued with the object of ascertaining the best type of market chickens. Several new varieties have been originated and exploited with strong claims to utility standpoints as winter layers and rapid flesh makers. These are receiving careful attention, and the data being secured are likely to be of material benefit to those directly interested. It may, however, be said that so far no variety of poultry has come to the fore that will warrant any change in the recommendation made in previous years to the farmers of the country to adopt Plymouth Rocks or Wyandotte breeds as the best all the year round money makers, when properly handled.

Interesting and important results in the hatching and rearing of chickens by incubator and brooder as compared with natural mother has been ascertained, and go to show that should the farmer desire to get his chickens hatched and reared early and in number, the artificial method will afford him the best means of doing so.

Experiment has also shown that in order to have the strong, early chickens, which will make vigorous and rapid growth, it is necessary that the germs of the early eggs should be strong. The best means of securing these strong germs, from fowls which have layed well all winter, have been exercise and fresh air. Happily the majority of farmers are so situated that these requisites can, with little difficulty, be afforded their laying stock. Experimental fattening of chickens of different breeds and on different rations, in crates and with limited runs, shows useful results.

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During the year addresses were delivered in different parts of the country on poultry keeping in all its different phases.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES.

The lines of experimental work undertaken at the branch farm at Nappan, N.S., are mainly such as are likely to be of practical value to the farmers of the Maritime provinces. The tests carried on in feeding with a view to milk production, and also for the production of beef, occupy a prominent place here for the reason that these branches of agricultural industry receive the attention of a considerable number of farmers in these provinces.

The rich pastures in the valley lands in this part of the country have long been utilized for dairy purposes, and hence experiments along dairy lines are of interest to the public. The milking herd of cows kept at Nappan contains good representatives of some of the best milking breeds. Records of the quantity and quality of the milk given by these animals are kept and the relative position they occupy as factors in profitable dairying ascertained and given to the public in the annual report of the farms. Tests are also conducted in the feeding of steers to find out the influence of age on the feeding, also the fattening value of the different sorts of food used.

Additions have been made to the orchard, which now contains a considerable number of varieties of fruit trees, most of which are proving suitable to the climatic conditions found there. Many of these have borne good crops and their relative value has been tested and samples of their produce have been shown at the more important agricultural exhibitions held in these provinces.

The results obtained from the uniform test plots of grain, Indian corn, field roots and potatoes serve a useful purpose by calling attention to those varieties which are most productive and profitable.

EXPERIMENTAL FARM FOR MANITOBA.

On the experimental farm for Manitoba, at Brandon, many different varieties of cereals have been grown to ascertain the suitability of the sorts tested to that district, as to hardiness, period of ripening, and relative productiveness. Similar experiments have also been carried on with field roots, Indian corn and potatoes, with the same objects. Tests have also been made with grasses, clovers, flax and other useful plants.

Additional experiments have been undertaken in the fattening of steers and swine, to gain information as to the relative usefulness and economy of such foods as are generally available to the farmers of Manitoba. Tests have also been conducted with some of the best breeds of poultry to find out those which are most profitable for the production of eggs and flesh. Some male animals, representing important breeds, are kept at this farm for the improvement of stock.

Good progress has been made in the raising of improved forms of the wild plum, which is found native in many localities in this province. Wherever varieties have been found of superior quality and earliness, a quantity of seed of such has been ob-

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tained and planted, from which many new seedlings have been raised. Among the new varieties thus produced, there are some which are considerably earlier in ripening than the average and are of good quality.

Some additions have been made during the year to the varieties of ornamental trees and shrubs under cultivation in the arboretum, also to the selection of bulbs and perennial plants grown in the flower borders. The results achieved at the Brandon farm have awakened a general interest in this subject in many parts of Manitoba and the influence of the work of this farm is seen in the more frequent planting of trees and shrubs about farm and town houses and in the more general cultivation of flowers for the adornment of homes. The very large number of farmers, amounting to many thousands, who annually visit this farm, carry away with them many new ideas and aspirations, which lead not only to the improvement of their methods of farming, but also to the further planting of trees and shrubs for shelter and ornament.

More than one and a half million young forest trees were grown on this farm during the year for the forestry branch of the Department of the Interior.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES.

The experimental farm at Indian Head, Assa., established for the purpose of assisting the farmers in the North-west Territories, continues to do most useful work, and the experiments conducted during the past year have covered a wide field. In this part of the Dominion the raising of cereals is so important that a large proportion of the cultivated area on this farm is devoted to their growth. Owing to the unusual cool weather, and consequent backwardness of the season, the ripening of all varieties of grain was considerably delayed and some late ripening sorts failed to reach maturity before frost came, and hence were more or less injured. This condition emphasized the importance of the more general cultivation of the earlier ripening sorts, particularly of wheat. The superintendent of the farm reports that of the nine varieties of wheat grown in field lots this year, only three were fully matured and harvested before frost came. These were three of the cross-bred wheats—Preston, Stanley and Huron—which were originated at the Central Experimental Farm at Ottawa. These, although sown later than the other sorts, were cut and in stook five or six days earlier than the five other varieties grown in adjoining fields, and the three cross-bred sorts mentioned were the only ones which, on account of early ripening, escaped injury from frost and would grade No. 1 Hard. Under my instruction, samples of the Preston and Stanley were submitted, during the year, to examination by some of the best experts in the United States and Great Britain; they were also analysed by the chemist of the experimental farms. The reports received show that these wheats are of excellent quality and there seems no reason to suppose that their more general introduction in the North-west would in any way lower the quality or reputation of the wheat produced there, while their more extended growth would be a great advantage and convenience to those engaged in wheat growing.

Sixty-two varieties of wheat were sown in the uniform test plots, where they were grown under like conditions. A large number of varieties of oats, barley and pease were

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also tested, together with many sorts of fodder corn, field roots and potatoes. The results of these annual trial plots are published as early as possible in the season, so that farmers may have time to consider them carefully before deciding on their choice of seed for the ensuing year.

The orchards of cross-bred and seedling crab apples are making good progress and attracting much attention. The improvements made in the size and quality of these fruits, by intelligent cross-breeding, is remarkable.

The growing of young trees and shrubs for free distribution in mail packages to settlers has been continued and large numbers are sent out every year in that way. About three million of young forest trees have also been grown during the year on this farm, under my instruction, for the forestry branch of the Department of the Interior.

Experiments have been continued with Awnless Brome grass and Western Rye grass and other hay and pasture grasses, with good results. Further experiments have also been conducted in the fattening of steers.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA.

At Agassiz, where the experimental farm has been established for the benefit of the farmers of British Columbia, a large and comprehensive series of experiments has been continued. Many varieties of all the more important cereals have been tested for the purpose of finding out those which are most vigorous and productive in this climate, and samples of those which promise to be of the greatest value are distributed among the farmers for trial. In like manner, the relative merits of many different sorts of Indian corn, field roots, potatoes, grasses, clovers and other fodder crops have been tested and much information gained. Experiments have also been conducted with fertilizers on fruit trees and on farm crops and the effects of the fertilizers carefully watched and recorded.

The fruit orchards have been further extended and the collection of varieties is now very large. Many of these fruited during the past year and descriptions will be found in the report for 1903 of such varieties as have not fruited before. An extensive collection was shown at the exhibitions held in October at New Westminster and Victoria, where they were greatly admired. Fruit growing is made a specialty at this farm, and the large trial orchards are proving of much value to the fruit growers of British Columbia, as they furnish information regarding the most productive and profitable sorts to grow, also as to those which are most resistant to the diseases which injure fruits in that climate.

The stock kept at this farm consists of Shorthorn cattle, Dorset-horned sheep, improved large Yorkshire and Berkshire swine, and several breeds of poultry.

Many different kinds of vegetables are annually tested here to determine which are the most profitable to grow in that climate, and large collections of trees, shrubs and flowers have also been established. The farm is beautifully situated in a charming valley surrounded by mountains, and it is visited annually by large numbers of farmers and fruit growers and others interested in the work which is being carried on.

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GENERAL CROPS.

RESULTS OF THE PAST SEASON.

The crops harvested in Canada during the past year have on the whole been very satisfactory, and another good year has been added to the list. The area under crop throughout the Dominion has been considerably increased and the returns with a few exceptions are well above the average.

ONTARIO.

The crops in this province have been very bountiful. In fall wheat the yield per acre has been large, much above the average, and the quality of the grain as a rule has been excellent, plump and well ripened, weighing in some instances 62 to 64 lbs. per bushel. Taking into consideration both yield and quality, the crop of fall wheat this year has been one of the best ever had in Ontario. In spring wheat also the crop was good; much above the average of past years.

Oats have given a very heavy yield, over six bushels per acre above the average of the past eleven years. The area under this crop in 1903 was almost as great as the total acreage in hay and clover and much exceeds the area occupied by all other cereals.

The acreage occupied by barley is increasing considerably, and the crop of the past season has been unusually large, nearly eight bushels per acre above the average of the past eleven years.

The pea crop has been encouraging, better than for some years past, and the injury from the weevil has been much less than for the past year or two. Indian corn, owing to the very dry weather in May, did not germinate promptly, and the maturing of the crop was somewhat delayed. Later in the season the weather was favourable and that part of the crop which was grown for fodder was nearly an average one, while in those districts where ripened corn is harvested the yield was above the average.

Potatoes in many localities have suffered much from rot; notwithstanding this the crop has been above the average. Field roots on the whole have turned out well, and hay and clover have given about an average return.

The season of 1903 has given an unusual crop of plums and the markets were glutted with this fruit for a time, so that prices ruled low. There has been a fair crop of apples throughout this province and the quality of the fruit has been good.

QUEBEC.

The crops in this province have also on the whole been satisfactory. In many localities, especially where the land had been recently seeded, a good crop of hay was secured, but on old meadows the yield was much lighter.

Oats in most districts have given excellent returns both of grain and straw, and the area under crop was large. Spring wheat has yielded fairly well, while barley has given unusually heavy returns. Indian corn grown for fodder has given less than the

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average yield owing to unfavourable weather in the spring. Potatoes have given good crops, but rot has been prevalent in many sections. Buckwheat has in many localities given excellent crops.

During the greater part of the season the pastures have been in unusually good condition, and the increase in the output of dairy products has been large. The amount of money paid this year to the farmers of Quebec for cheese and butter is estimated at about ten million dollars.

The apple crop has been a very fair one and small fruits have yielded bountifully.

THE MARITIME PROVINCES.

In the maritime provinces the early part of the season was particularly dry and crops generally made a poor start. Subsequently the weather was favourable and the growth rapid. Oats did remarkably well and gave an excellent crop. In barley the yield was above an average one and spring wheat gave a good average return. The quality of the grain is quite satisfactory, being plump and well matured. There was very little rust this season.

Owing to the very dry weather in June, hay gave a crop below the average. Pastures also were somewhat injured by the drought, and in many places did not fully recover. Buckwheat has given crops above the average.

Field roots have given excellent returns, turnips especially have yielded heavily. Indian corn grown for fodder has given lighter crops than usual.

The apple crop has on the whole been a good one, considerably above the average, and the quality has been excellent, the fruit being very free from spot.

MANITOBA.

While the area under wheat in Manitoba has been larger, the total crop has fallen considerably below that of 1902, and owing to unfavourable weather during harvest, the grain has graded lower than usual. The high prices, however, received by farmers for their wheat this year has done much to make up for the shortage in volume of crop, and the results of the year are regarded as fairly satisfactory. The very dry weather in June was also probably one of the causes of the shortage in the grain crop, as thus growth was checked at a critical period.

A much increased acreage is reported as broken this year, which promises well for the future.

The oat crop has been a very good one, and heavy yields are reported in many districts. Barley has given a full average return. The crop of hay is fairly good.

The output of dairy products has increased. The production of cheese in Manitoba in 1903 showed an increase of 26 per cent over that of 1902; and creamery butter an increase of 9 per cent.

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THE NORTH-WEST TERRITORIES.

The wheat crop in the North-west Territories has not averaged as high as it did last year. The weather was very dry in May and much of the grain early sown was late in germinating, and August being cold and wet, these crops so late in starting were slow in maturing, and many of them were caught by frost on the morning of September 5, before they were fully ripe. This applies particularly to fields with heavy growth on fallowed land, a large proportion of that sown on stubble ripened before frost came, and gave satisfactory returns. The high prices realized this season for wheat have been very helpful to the North-west farmers.

Oats, where sown early and on land well prepared, have given excellent returns: barley also has given satisfactory yields.

The crop of hay, owing to the dry spring, was lighter than usual, but field roots and potatoes did remarkably well. Stock throughout the Territories did well although prices have not ruled as high as last year.

BRITISH COLUMBIA.

In the coast climate of British Columbia the weather throughout the growing season has been unusually cool and showery, nevertheless the crops have been fairly satisfactory.

Hay has given good returns and the larger part of the crop was fairly well saved.

Oats have yielded well somewhat above the average and the grain is fairly plump, barley also has given above an average crop. Spring wheat and pease have given good returns.

Indian corn grown for ensilage, gave a very fair crop, notwithstanding the unusually cool weather, and field roots of all sorts gave heavy returns. The potato crop was good and the tubers were almost free from rot.

The fruit crop has been only a medium one, but apples have been freer from scab than usual. Plums have given a fair crop, but have again suffered in the coast climate from rot.

On Vancouver Island the season has been drier and fruit has yielded well. In the interior drier districts on the main land fruit was abundant, and the crop of apples in many localities heavy and of excellent quality. Plums also yielded well and there was not much injury from rot either on Vancouver Island or in the fruit orchards in the interior.

The crop of hops both on the coast and in the interior was large and the outcome satisfactory.

LIVE STOCK INSPECTIONS

For Year ended October 31, 1903.

EXPORT INSPECTIONS.

Cattle.....	191,697
Horses.....	766
Sheep ...	80,784
Swine.....	81

IMPORT INSPECTIONS.

	Cattle.	Horses.	Sheep.	Swine.	Goats.	Mules.
I.—From Europe.....	259	309	243	124	93	.....
II.—From the United States	45,038	46,740	21,731	1,373	.....	1,203
III.—From Mexico	24,253	1,204	.....	.....	.....	31
IV.—From Newfoundland.....	.....	1	.....	.....	.....	.....
Total	69,550	48,254	21,974	1,497	93	1,234

ARCHIVES.

The following is a list of the books received during the past year:—

From London—

- Nova Scotia General Correspondence to 1742.
- Nova Scotia Journals to 1800.
- Nova Scotia Acting Governors, 1743 to 1749.
- Despatches to Governors Upper Canada to 1840.
- Prince Edward Island Minutes of Executive Council to 1801.

From Paris—

- Collection de Moreau de St. Mery to 1696.
- Correspondance Générale.
- Mémoire sur le Canada 1706-1710.
- Lettres de la Cour et réponses 1710.
- Instructions du Roi aux gouverneurs 1704-1708.
- Pontchartrain aux Randot 1703-1708.
- Réponses des Randot 1705-1708.
- Etat Civil Canada 1715-1756.
- Etat Civil Louisbourg 1728-1758.
- Etat Civil Repertoire.

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III.—PATENTS OF INVENTION.

The following comparative tables show the transactions of the Patent Branch of the Department of Agriculture, from the calendar year 1893, to the year ended October 31, 1903:—

Years.	Applications for Patents.	PATENTS AND CERTIFICATES GRANTED.			Caveats.	Assignments of Patents.
		Patents.	Certificates	Total.		
*1893	2,614	3,153	292	3,445	229	1,345
1894.	3,291	2,756	462	3,218	301	1,445
1895.	3,387	3,074	422	3,496	343	1,550
1896.	3,728	3,488	413	3,901	306	1,420
1897.	4,300	4,013	284	4,297	377	1,551
1898.	4,200	3,611	262	3,873	363	1,657
1899.	4,305	3,151	412	3,563	311	1,467
1900.	4,628	4,522	482	5,004	283	1,914
1901.	4,817	4,766	551	5,317	302	2,323
1902.	5,301	4,391	510	4,901	317	2,339
1903	5,912	5,673	432	6,105	328	2,384

* For 10 months only.

DETAILED STATEMENT, Patent Office Fees.

Years.	Patents.	Assign- ments.	Caveats.	Copies.	Subscrip- tion to 'Patent Record.'	Notices to Apply for Patent.	Sundries.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
*1893.....	58,441 81	2,633 71	1,244 70	796 15	285 18	337 81	110 73	63,850 19
1894.	73,061 77	3,142 74	1,793 40	764 07	347 21	1,449 80	123 57	80,682 56
1895	78,223 52	3,194 00	1,854 35	761 54	245 98	1,951 30	129 79	86,378 48
1896.....	85,060 61	3,130 56	1,790 65	898 27	420 60	2,245 79	57 04	93,532 52
1897	93,298 16	3,250 23	2,108 57	969 33	252 53	2,110 89	128 21	102,117 92
1898.....	91,176 44	3,641 90	1,935 74	706 50	266 44	1,463 10	172 73	99,361 95
1899....	98,669 92	3,781 71	1,533 25	1,028 80	198 05	1,912 00	137 83	107,261 56
1900	104,848 96	4,255 40	1,405 00	932 54	552 71	1,742 70	115 15	113,852 46
1901.	109,985 59	4,506 07	1,479 25	882 87	592 47	2,484 90	133 22	120,064 37
1902.....	119,766 43	5,079 20	1,565 35	1,112 59	327 95	1,883 00	162 30	129,896 82
1903.....	130,561 00	5,309 00	1,863 00	1,067 82	373 75	1,994 25	254 99	141,363 81

* For 10 months only.

The Patent Office fees received during the year ended October 31, show a surplus of \$82,422.63 over the working expenses of the office as per subjoined table.

Receipts.	\$ cts.	Expenditure.	\$ cts.
Cash received.....	141,363 81	Salaries.....	39,235 00
Cash refunded.....	2,325 94	' Patent Record '.....	17,380 24
			56,615 24
		Receipts over expenditure.....	82,422 63
Net cash.....	139,037 87		139,037 87

The following is a table of the countries of residence of the patentees for the years named:—

Countries.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.
Canada.....	685	661	707	740	756	710	601	707	744	654	794
England.....	206	177	179	215	266	261	205	254	256	239	248
United States	2,061	1,731	1,980	2,270	2,666	2,312	2,038	3,216	3,423	3,164	4,222
France.....	24	24	21	24	26	39	36	40	50	45	57
Germany..	88	108	102	117	126	124	112	157	125	100	116
Other countries...	89	55	85	122	173	165	159	148	168	189	236
Total	*3,153	2,756	3,074	3,488	4,013	3,611	3,151	4,522	4,766	4,391	5,673

*For 10 months only.

The Canadian patentees were distributed among the provinces of the Dominion as follows:—

Provinces.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.
Ontario.....	437	404	451	430	464	383	310	396	407	373	438
Quebec...	151	162	177	201	178	171	160	164	185	148	194
New Brunswick	23	13	13	12	20	26	7	14	26	14	18
Nova Scotia.....	29	15	19	32	22	27	18	21	17	26	22
Pince Edward Island.....	3	2	6	2	2	4	8	1	0	1	2
Manitoba and the North-west Territories...	26	38	18	28	36	45	50	42	52	40	64
British Columbia	16	27	23	35	34	54	48	69	57	52	56
Total.....	*685	661	707	740	756	710	601	707	744	654	794

*For 10 months only.

Patents issued to residents of Canada, with the ratio of population to each patent granted:—

Provinces.	Patents.	One to every
British Columbia	56	3,190
Ontario.....	438	4,960
Manitoba and North-west Territories.	64	7,290
Quebec.....	194	8,483
New Brunswick.....	18	18,397
Nova Scotia.....	22	20,885
Prince Edward Island.	2	51,629
Total.....	794	

Statement of the number of patents issued under the Act of the session of 1892, 55-56 Vic., chap. 24, on which the fees are paid for periods of six, twelve or eighteen years, at the option of the patentee; and of patents on which certificates of payments of fees were attached after the issue of patents originally granted for periods of five and ten years.

[illegible]

The preceding tables show that there has been a large increase in the transactions of the Patent Office during the past year. The total revenue for the year ended October 31, 1902, was \$141,363.81, exceeding all previous years; resulting in an in-

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crease of \$11,466.99 over the preceding year, and a surplus of \$82,422.63 over the expenditure.

The total number of reports issued by the examiners during the year was 7,982.

Out of the total number of patents granted during the year, there were 4,222 issued to inventors resident in the United States, being over 74 per centum of the whole issue.

Patentees who are resident in foreign countries, continue to avail themselves of the privilege granted under section 8 of 'The Patent Act,' by giving notice of intention to apply for patents in Canada. The number of these notices registered during the year was 974, yielding a revenue of \$1,994.25.

The 'Canadian Patent Office Record' continues to be published monthly. It contains a transcript, with drawings, of all claims of patents granted, dates of filing, dates of issue, and length of term for which fees have been paid; also names and residences of patentees, as well as containing a list of registered copyrights, trade marks and designs. This publication is of great and increasing value to all who are interested in patents, trade marks, copyrights and designs. It affords convenient and easy reference to the claims of all patents granted in Canada, and thus enables both inventors and the public to see exactly what is patented.

This publication is supplied to foreign patent offices, and is also sent without charge to a large number of free libraries in Canada, and in foreign countries, with the object of diffusing in the public interest the information therein contained. The publication is also furnished to the public at \$2 per annum, or 20 cents for single monthly numbers.

This branch of my department is indebted to the British and United States Patent Offices, for their weekly official reports.

The classification of Canadian patents from June 8, 1824 (the first Canada patent) to October 31, 1903, has been completed and is now in the hands of the examiners, and is being continued as the patents are issued.

It may be remarked that this classification of patents has been a very onerous undertaking, embracing, as it does, all Canadian patents from the beginning of the patent office down to the present period; but the time and expense involved in the preparation of this compilation will be amply repaid in its usefulness to the examiners in the discharge of their duties, insuring a more reliable examination and a great saving of time in making the necessary researches.

I have again to direct the attention of patentees and their solicitors, to the necessity of remitting partial fees before the expiry of the six and twelve years' terms, otherwise the patents will cease and determine, the Commissioner not being vested with the discretionary power, under any circumstances, to revive them. A revival can only be secured by a private Act of Parliament, the obtaining of which entails considerable expense to the patentee. It may further be added that the Committee on Private Bills usually discourages applications of this kind, on the ground that no one should be denied the right of manufacturing, using or vending an invention which has become

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the property of the public. Exceptional cases may arise, however, in which the patentee or the holder of the patent may be justly entitled to relief from parliament.

It is in the interest of both the applicants and the office that great care should be taken by applicants and their attorneys in the preparation of the papers and drawings which are required by the rules and forms.

The Act to amend 'The Patent Act' passed during the last session came into force on the thirteenth of August, 1903.

In view of the judgment of the Supreme Court of Canada in the matter of *Power versus Griffin*, delivered the fifteenth day of December, 1902, the amending Act affords remedial measures in respect to patents under which manufacture was not commenced within the prescribed time mentioned in the repealed section 37 of 'The Patent Act,' and in cases where second or subsequent extensions of time to manufacture were granted. Provision is also made under section 9 for the legalization of all extensions of time for manufacturing and importing, hitherto signed by the Deputy Commissioner or Acting Deputy Commissioner, and section 1 provides that the Deputy Commissioner, or the Acting Deputy Commissioner, in his absence, may perform any act or thing, whether judicial or ministerial, which the Commissioner is authorized or empowered to do by any provision of 'The Patent Act.'

The amending Act makes the existence of a Canadian patent entirely independent of the life of the corresponding patent elsewhere, and applies to existing patents as well as to those granted hereafter.

The Commissioner is given the power under section 7 to order that certain patents, having due regard to the nature of the invention, be placed under the conditions of the license system instead of being subject to the manufacturing conditions set forth in section 4 of the amending Act.

Since the Act came into force a very large number of applications have been received from patentees to have their patents made subject to these conditions. In dealing with these applications the requirement of the law in regard to manufacture has been kept in mind. The applications which have been granted are those relating to patents for inventions such as the following: An art or process; improvements on a patented invention when both patents are not held by the same person; appliances or apparatus used in connection with railways, telegraph, telephone and lighting systems, and other works usually under the control of public or large private corporations, and which appliances or apparatus cannot be installed or constructed without the consent of such corporations; and certain inventions which are manufactured or constructed only to order, and are not, according to custom, carried in stock.

In consequence of an opinion given by the Department of Justice on the ninth day of April, 1903, to the effect that the Patent Office had, up to that time, given too liberal an interpretation to the law in dealing with applications for extensions of time to manufacture and import, the practice of the office in that regard has been changed, and since that date the law has been applied according to its strict and literal meaning, and the applications have been granted only when the applicant has clearly established

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to the satisfaction of the office, by affidavit or solemn declaration, that the failure to manufacture or import is due to no fault of his, but to reasons beyond his control. Although these applications continue to be quite numerous, it is seldom that such a case is made out as warrants the granting of the application.

The regular work of this branch of my department during the year has been attended to with as much dispatch as possible, and I am pleased to say that the number of applications unavoidably in arrears in the examiners' divisions has been greatly reduced.

IV.—COPYRIGHTS, TRADE MARKS, INDUSTRIAL DESIGNS AND TIMBER MARKS.

STATEMENT of fees received by the Copyright and Trade Marks Branch from November 1, 1902, to October 31, 1903.

Months.	Trade Marks.	Copyrights.	Designs.	Timber Marks.	Assign- ments.	Copies.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1902.							
November	1,383 75	101 00	50 00	6 00	7 00	26 25	1,574 00
December	1,289 85	131 50	35 00	4 00	31 25	12 00	1,503 60
1903.							
January	1,016 65	88 75	48 00	8 00	15 00	5 00	1,181 40
February	1,630 90	97 00	70 00	4 00	19 00	10 25	1,831 15
March	1,455 25	69 50	73 50	4 00	39 00	16 00	1,657 25
April	1,160 25	113 00	65 00	2 00	18 00	14 50	1,372 75
May	1,551 00	93 00	38 50	2 00	168 00	16 50	1,869 00
June	1,116 10	145 50	6 00	2 00	35 00	4 10	1,308 70
July.	1,095 25	75 00	30 00	4 00	27 25	7 00	1,238 50
August	1,275 00	117 00	35 00	4 00	67 00	3 00	1,501 00
September.....	1,425 90	74 00	61 00	4 00	24 00	11 50	1,600 40
October.....	1,316 00	80 50	17 50	6 50	8 00	20 00	1,448 50
	15,715 90	1,185 75	529 50	50 50	458 50	146 10	18,086 25

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The following table shows a comparative statement of the business of this branch from 1893 to October 31, 1903, inclusive :—

Year.	Letters Received	Letters Sent	Copyrights Registered.	Certificates of Copy rights	Trade Marks Registered.	Certificates of Trade Marks	Industrial Designs Registered	Certificates of Industrial Designs.	Timber Marks Registered.	Certificate of Timber Marks.	Assignments Registered.	Fees Received.
												\$ cts.
1893	1,452	2,070	475	126	257	257	41	41	19	19	55	8,013 33
1894	1,882	2,720	546	216	311	311	39	39	20	20	77	9,463 63
1895	2,184	3,279	601	163	374	374	52	52	20	20	70	11,673 26
1896	2,185	3,437	653	212	331	331	68	68	14	14	161	10,579 54
1897	2,606	3,548	756	273	446	446	75	75	13	13	94	14,101 93
1898	2,576	3,453	734	275	423	423	136	136	15	15	114	13,535 17
1899	2,487	2,910	702	237	430	430	112	112	5	5	117	14,161 28
1900	2,679	3,213	893	247	447	447	126	126	22	22	136	14,782 53
1901	2,605	3,211	888	249	521	521	146	146	24	24	183	16,823 26
1902	2,687	3,257	900	196	528	528	164	164	26	26	222	17,703 09
1903	2,687	3,211	900	176	557	557	88	88	23	23	272	18,086 25

The total number of registrations of copyrights, trade marks, industrial designs and timber marks, including registrations of assignments, was 1899, during the year ended October 31, 1903. This consisted of 900 registrations of copyrights, 557 registrations of trade marks, 88 of industrial designs and 23 of timber marks. There were also issued 170 certificates of copyrights, 49 registrations of interim copyrights, and 6 certificates, 6 registrations of temporary copyrights, and 3 certificates. The total number of assignments of these different rights recorded was 272.

The correspondence of this branch of the department amounted to 2,687 letters received; 3,211 letters sent.

The amount of fees received during the year, as certified by the accountant, amounted to \$18,086.25.

V.—PUBLIC HEALTH AND QUARANTINE.

The threatenings of the bubonic plague, cholera and small-pox mentioned in my last annual report have continued throughout this year.

The continuation of strict precautionary measures, ordinary and special, for the sanitary protection of the country has therefore been necessary.

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The increasing public demand for governmental recognition of the importance of hygiene and preventive medicine is instanced by the fact that I am, again, in receipt of a copy of a resolution, adopted by the Canadian Medical Association at its annual meeting at London, in August last, again pressing upon the consideration of the government the expediency of creating a department of public health, under one of the existing ministers.

In consequence of the marked threatening of infectious disease on both our coasts and on our frontier, circulars of warning and instruction have been issued from time to time to the transportation companies and to the quarantine and customs officers.

The exemption from routine inspection of vessels arriving from New York and ports north thereof—usual in healthy years—was not permitted during the greater part of the year, owing to the continued presence of small-pox in the New England and neighbouring states. Upon the diminution of the epidemic, however, during last summer the exception from routine inspection was again extended to these vessels from and after August 15.

So on the Pacific side inspection of all vessels from San Francisco has been maintained throughout the year on account of the continued presence of the bubonic plague in that city.

Frontier and extra coast inspections for small-pox on threatened parts of the international border and of the sea-board have been maintained more or less throughout this year, as the conditions to the south of us seemed to me to require.

Such extra inspections I instituted or continued at the following places: in Nova Scotia, Louisbourg, Canso and Yarmouth; in New Brunswick, McAdam Junction; in Ontario, Owen Sound, Thessalon, Bruce Mines, Sault Ste. Marie, Rainy River, Port Arthur, and Fort William; in Manitoba, Sprague, Emerson, Gretna, Morden, and Crystal City; in the North-west Territories, North Portal, Coutts and Macleod; and in British Columbia, Northport (for Rossland and Nelson), Grand Forks, Greenwood, Huntingdon, and Blaine.

In addition to the officers holding these posts Dr. James Patterson, of Winnipeg, has continued to act for me in the management and suppression of small-pox in the North-west Territories.

The bubonic plague has claimed victims from time to time during this year in San Francisco. There have been five fatal cases reported this month. The total cases of this disease in that city from the beginning of the outbreak up to this date have been one hundred and seven, and the deaths one hundred and two.

This disease has occurred during the year in South Africa, Australia, Bolivia, Brazil, Chili, China, Egypt, Formosa, France, Germany, Hawaiian Islands, India, Japan, Mauritius, Mexico, New Caledonia, Peru, Philippines, Turkey, Straits Settlements, and in San Francisco.

It did not make a footing on our shores, but cases of plague occurred on three of the vessels which trade between the Orient and British Columbia.

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The disinfection of these and similar vessels coming from the Orient at the ports of departure lessens the routine disinfecting work at my British Columbia maritime quarantine station, whilst it also lessens the threatening of the arrival of infected vessels, persons and things.

The facts connected with the conveyance and communication of plague by rats and the fleas that infest them have continued to be the subject of scientific investigation, and experiments are being made in other countries to determine the best method of destroying rats in vessels without the necessity of removing the cargo, and yet without danger of injuring it.

Cholera has prevailed during the year in Brazil, China, Dutch India (Java and Batavia), Egypt, India, Japan, the Philippine Islands, the Straits Settlements, Syria and Turkey.

Yellow fever: The observations and literature of the year in connection with this disease confirm the belief in part played in its dissemination by the mosquito, the *Stegomyia fasciata*, acting as an intermediate host for the yellow fever parasite.

In Havana this disease has been endemic and epidemic for many years. As a result of the scientific crusade against the *Stegomyia fasciata* and the screening of patients there has not been a single case of local origin in Havana for two years. Nine cases were brought into the city during last summer, but, having been so protected that no mosquitoes could gain access to them, they were unable to convey the infection to others, and so no subsequent cases developed from any of the nine.

Small-pox has prevailed world-wide during the year. It has continued to threaten us on both the Atlantic and Pacific coasts and along our international frontier.

The diseases which have been brought to my maritime quarantine stations during the year are small-pox, enteric fever, scarlet fever, diphtheria, measles, chicken-pox and beri-beri.

In not a single instance during the year did any one of these diseases gain an entrance through any of my organized maritime quarantine stations. My frontier inspections were also very efficient in keeping out actual cases of disease and in promoting vaccination.

In these ways great good has been done in protecting the public health of the country with the minimum interference with travel and traffic.

Details of this year's work at my different stations, at the Tracadie Leper Lazaretto, and under the Public Works Health Act, will be found in the reports of my officers annexed hereto.

VI.—STATISTICS.

The Statistical Division of the Department of Agriculture is based upon the Union Act of 1867, which specifically assigns Census and Statistics to the exclusive authority of the Parliament of Canada.

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In accordance with this assignment of duties the Dominion Parliament passed Chap. 21 Acts of 42 Victoria.

In the Revised Statutes of Canada, 1886, this Act forms Chaps. 58 and 59. Chap. 60 is the authority for the collection of Criminal Statistics.

Chapter 59 Revised Statutes of Canada provides (1st section) for the collecting, abstracting, tabulating and publishing of vital, agricultural, commercial, criminal and other statistics by the Department of Agriculture.

The fourth section gives the Minister of Agriculture power to arrange with any Lieut.-Governor in Council, or with any provincial organization for the collection and transmission of information collected under provincial systems.

The fifth section says:—

‘The Minister of Agriculture may, in collecting statistics in the manner provided by this Act, call upon any and all public officers to furnish copies of papers and documents and such information as lie respectively in the power of such officers to furnish, with or without compensation for so doing, as is regulated, from time to time, by the Governor in Council.’

The sixth section provides for the publication of an abstract and record of the various departmental or other public reports and documents.

The seventh section gives power to the Governor in Council to authorize the Minister of Agriculture to cause special statistical investigations as regards subjects, localities or otherwise to be made.

The eighth section empowers the Minister of Agriculture to cause all statistical information obtained to be examined, and any omissions, defects, or inaccuracies discernible therein to be supplemented and corrected as far as possible.

The ninth section is as follows:—

‘Everyone who wilfully gives false information or practices any deception in furnishing information provided for by this Act shall, on summary conviction before two justices of the peace, be liable to a penalty not exceeding one hundred dollars.’

By another section of the Act, the Governor in Council is empowered to appoint temporary clerks or employees for an indefinite period.

The evident aim and intention of these several Acts is the establishment of a Bureau of Statistics; which shall form part of the Department of Agriculture, and in which shall be consolidated the general statistics of the country, the officers in charge of which shall have every facility necessary to enable them to obtain the needed statistics from the several departments of the federal government, and of the provincial governments, or by special statistical investigations.

A general collection and issue of Dominion government statistics by the statistical division, as directed by the statute, would establish uniformity, coupled with increased accuracy and large economy in compilation.

The statistical division has collected during the year, material to enable it to provide a system for collecting agricultural statistics throughout the Dominion supple-

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mentary to the systems employed in some, but not all of the provinces. If a good plan insuring accuracy and early publication could be adopted in Canada, the value to farmers and business men of this information can hardly be over-estimated. The crop reports of the United States, going over all Europe monthly, are a good advertisement of the agricultural possibilities of the country, while an early knowledge of the actualities gives to growers and dealers an advantage, in connection with output and prices, which is of direct pecuniary value.

The frequency with which applications are made to the statistician for information about the crops of Canada, coming as these applications do both from within the Dominion and from outside countries, suggests the advisability of establishing in the near future a statistical inquiry dealing with crops, prices, cost of transportation and like matter.

A great increase in the number of applications for statistics is one feature of the year's experience.

The greater interest taken in Canada is seen in this increased demand.

Annual publications of many countries call for statistics of Canada to a much larger extent than in former years. The number of the list is so great as to make large demands on the time of the officers of this division.

HEALTH STATISTICS.

No steps have been taken as yet to provide a better system of collecting vital statistics than that which was abolished in 1891.

In the provinces of Ontario, Quebec, New Brunswick, British Columbia, Manitoba and the North-west Territories, the provincial and territorial authorities have placed on the statute-books Acts dealing with the collection of vital statistics. Section 4 of chap. 59, Revised Statutes of Canada, already quoted, gives the necessary legislative authority to enable my department to join the provincial authorities in making arrangements for the better collection of different kinds of statistics, without limiting the power of my department to enter upon provincial fields not worked by provincial organizations. By a combination of forces the result would be more satisfactory than by any other system that could be originated by the federal authorities. Instead of clashing statistics there would be statistics having a joint approval.

• CRIMINAL STATISTICS.

The special analysis of these statistics which has accompanied in former years the general report of the department will be found, this year, as last, in the preliminary pages of the special blue book prepared by the statistical branch.

A few salient points may be given.

The number of convictions for all kinds of crimes and misdemeanours in Canada for the year 1902 was 43,536, which represents one convicted law-breaker in every group of 125 persons. This is the highest criminality recorded for the Dominion.

During the period 1891-1902, the average is equal to one in every 133. The years of lowest criminality were 1892 and 1893, when there was punished one law-breaker in every group of 138 persons.

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Taking the provinces of the Dominion, the largest group to each convicted person in 1902 was found in Prince Edward Island.

According to provinces the record is as follows:—

1902.

Prince Edward Island.....1	convicted person in each group of	285
New Brunswick.....1	“ “	139
Nova Scotia.....1	“ “	120
Quebec.....1	“ “	178
Ontario.....1	“ “	112
Manitoba.....1	“ “	119
N. W. Territories.....1	“ “	74
British Columbia.....1	“ “	54

At one end of the Dominion stands Prince Edward Island with the largest group of persons from which one was drawn during the year, and branded as a criminal. At the other end is British Columbia with one criminal in every 54 of her inhabitants.

The above table includes all kinds of misdemeanours, the serious offences and such others as breaches of municipal laws, vagrancy, drunkenness and the like.

Indictable offences include only murder and manslaughter and other offences against the person, robbery with violence, burglary, horse and cattle stealing and other offences against property.

Of these there were 5,660 convictions in 1902.

Taking the provinces and the years 1891 and 1901, to institute a comparison, the record is:—

	1891.	1901.
P.E. Island.....1 convicted in each group of	3,760	6,070
New Brunswick.....1 “ “	3,350	2,610
Nova Scotia.....1 “ “	3,632	1,400
Quebec.....1 “ “	1,100	1,110
Ontario.....1 “ “	1,034	790
Manitoba.....1 “ “	1,660	1,280
N. W. Territories....1 “ “	1,345	874
British Columbia....1 “ “	700	400

Reduced to a per cent basis the size of the respective provincial groups containing one criminal convicted of serious crime has been changed in the decade 1891-1901, as the following table shows:—

Decrease or increase in size of group containing one criminal 1901 compared with 1891.

British Columbia group decreased..	43 per cent.
Ontario “ “ ..	25·5 “
Quebec “ increased..	0·9 “
Manitoba .. “ decreased..	28·0 “
N. W. Territories “ “ ..	35·0 “
New Brunswick “ “ ..	22·0 “
Nova Scotia “ “ ..	61·0 “
P. E. Island “ increased..	61·5 “

If a group of 3,632 persons contained one criminal in 1891, as in the case of Nova Scotia, and crime had so increased that each group of 1,400 persons had in 1901 a crim-

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inal, then the group had shrunk by 61 per cent from its earlier dimensions, thus representing a large increase in crime.

It will be seen that all the provinces have in varying proportions increased their quota of serious crime, excepting Prince Edward Island, in which the group of 1901 is 61½ per cent larger than that of 1891, showing that crime has greatly decreased in the decade. In the province of Quebec serious crime has practically neither increased nor decreased. A slight decrease is apparent, the group of 1891 being 1,100 and that of 1901 being 1,110.

Taking one class of charges from the summary convictions—drunkenness—it is noted that the number of convictions for the offence in 1902 was 13,324. During the 12 years 1891-1902, the yearly average number of convictions was 11,815, showing an increase in 1902, over the average, of 13 per cent. In 1902 in every group of 408 persons one was convicted of drunkenness. The year of least convictions was 1897, when the number was 10,586, and the group figures one in each 484 of the population.

By Provinces.

Ontario had..	3,944, or 1 in each group of	555
Quebec had..	2,783 “ 1 “	598
Nova Scotia had..	2,012 “ 1 “	229
New Brunswick had..	1,403 “ 1 “	236
Manitoba had....	1,003 “ 1 “	269
The Territories had..	757 “ 1 “	229
British Columbia had..	1,192 “ 1 “	159
P.E. Island had....	230 “ 1 “	446

Quebec, according to this list, is the freest from drunkenness of all the provinces. Ontario is a close second and Prince Edward Island third—some distance off, however. All the other provinces and the Territories fall far behind, the average of the five being 224 against an average of 576 for Ontario and Quebec.

British Columbia is the province with the largest number of convictions for drunkenness in proportion to population.

While it is not safe to draw any conclusion as to the prevalence of drunkenness from these data, for it may be that the laws are more stringent and the administration of the laws stricter in one province than in another, yet in a general way the indications are that 1st. drunkenness is on the increase in Canada, and 2nd. that a retrograde movement is observable even in such an advanced province as Ontario, the convictions having been more numerous in 1902 than in any previous year as far back as 1892.

The only province which shows a steady diminution in the convictions for drunkenness is Quebec, which in

1894 had one conviction for each group of	359 persons.
1895 “ “ “	360 “
1896 “ “ “	366 “
1897 “ “ “	409 “
1898 “ “ “	429 “
1899 “ “ “	434 “
1900 “ “ “	500 “
1901 “ “ “	555 “
1902 “ “ “	598 “

It is not to be supposed that the hand of the law has relaxed its hold on this vice. Nor is it possible that the collection of convictions is not as carefully made in late years as in the earlier ones. As a matter of fact the returns from which the compilations are made number six more in 1902 than they did in 1892, showing that a wider area is included in the returns of 1902.

It is satisfactory to find from the returns that in respect to crime in general—indictable crimes and drunkenness—Manitoba and the Territories possess a good record.

Notwithstanding the influx of outsiders, crime, as gauged by the number of convictions, has not greatly increased.

In 1902 the convictions for all kinds of crime in Manitoba were one in each group of 119 persons.

In 1902 from each group of 119 persons the courts took one person, tried him and convicted him of drunkenness.

In 1901 the group numbered 115. In 1895 it numbered 155, and in 1898, 162. There has been an increase in convictions, indicating an increase in crime. There has also been a recovery.

In the Territories there is declension from the primitive times when the group that supplied one criminal numbered 120, 106 and 103, as compared with the record of recent years, the 1898 group being 59, the 1899 group 47, and the 1900, 44 persons—the early years of the decade were paradisaic in their freedom from crime. The more recent years indicate that crime is being checked, the record being for 1901, one convicted person for each group of 58 of the population, and for 1902, one for each group of 74.

In indictable offences the record of the Territories and Manitoba is:

Year.	Territories.	Yukon.	Population.	Manitoba.	Population.
1902.....	272	48	233,333	223	273,514
1901.....	207	40	215,914	202	258,567
1900.....	170	95	199,843	269	244,667
1899.....	256		185,019	224	231,519
1898.....	190		171,342	200	219,079
1897.....	170		158,719	245	207,308
1896.....	144		147,067	181	196,171
1895.....	156		136,310	160	186,687
1894.....	171		126,375	186	178,020
1893.....	135		117,199	168	169,756
1892.....	95		108,721	82	161,876
1891.....	75		100,886	93	154,362

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Manitoba in 1891 had one individual convicted of serious offence in every group of 1,660 of her inhabitants, and with two or three exceptional years the record ever since is above the thousand in the group, 1902 giving one criminal in each group of 1,226.

The Territories did not begin with so good a record as Manitoba's, nor have they maintained their record as well. In 1891 there was one convicted criminal in each group of 1,345 of the inhabitants. The proportion rose in 1893 to one in 870, and in 1899 rose still higher to one in 723. In 1902 it was one in 730. For drunkenness there was one person convicted in each group of 601 of the inhabitants in 1891 and in 1902 one in each group of 229.

There were 359 persons making returns of criminal statistics under the statute in 1902. Of these 34 made returns showing that no charges of crime or law breaking had been tried during the year.

During the two years 1891 and 1892 the returns sent in averaged 284; so that there has been an increase of 75 in the number of persons making returns. Comparing the same two year periods the number of returns in 1891-2 which contained no record of trials, none having been held, was 27. In 1901-02 the number was 40. In the first period the percentage of 'clean sheets' to the total number of returns was 9.5, and in the second 11.5, indicating a larger area without crime in 1901-02, and as the number of convictions is greater, being one in 126 in 1901-02, against one in 132 in 1891-2, also indicating a concentration of crime due no doubt to the rapid growth of urban population.

THE STATISTICAL YEAR BOOK.

This work is published by my department under authority of chap. 59, sec. 6, Revised Statutes of Canada.

The demand for the book is greater each year. To meet this increasing demand, I enlarged the issue for last year by 1,500 English and 200 French. The demand still remained greater than the supply. Advantageous openings present themselves as the following letter from a delegate to the Congress of Associated Chambers of Trade of the Empire will show :—

SIR,—When I was on a visit to Canada this autumn, one of your citizens kindly presented me with a copy of 'The Statistical Year Book of Canada.' I have perused this with the very greatest interest, and it has enlightened me on many points of which I was previously ignorant. I was frequently reminded that Britons appeared to know very little about their premier colony. To help to correct this state of things, it would be to the general advantage if a copy of this valuable book could be sent to every free library and club in these islands. I do not know whether there are any funds available for the circulation of this information, but if not I should be pleased to make a small contribution towards the cost of distributing the same.

(Sgd.) HARRY ALLCARD.

Albert Works, Sheffield, November 16.

The plan of issue is to send first to the members of parliament and the government, the members of the several legislatures and the executives of the several pro-

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vinces, the leading newspapers, boards of trade, banks, libraries, British consuls and other representatives in different countries, the legislative libraries, of other parts of the British Empire. The remainder is held for distribution in Canada according to a permanent list, and to meet applications. It is in connection with the permanent list and applications that the supply falls short.

The following are the dates of the issues of the Year Book:—

1896—Issued.....	October 12, 1897
1897— “	October 4, 1898
1898— “	October 10, 1899
1899— “	August 21, 1900
1900— “	June 22, 1901
1901— “	May 15, 1902
1902— “	May 28, 1903

The provincial governments, I am pleased to note, have co-operated most heartily in the effort to publish the Year Book at an early date. The municipal authorities have been prompt in supplying the material required, and the various commercial and manufacturing firms, from whom information was sought, kindly and most considerately gave their prompt attention to the circulars sent them.

There is a great demand for back numbers to make up full sets. The demand from the United Kingdom for full sets has increased very considerably. As a result the issues of 1893, 1894, 1895, 1896, 1898, 1899, 1900 and 1901 are exhausted. In order to put before the members of the congress of Chambers of Commerce of the Empire who met in Montreal in August last, the fullest possible information about Canada, I had a special edition of 500 copies of the Year Book prepared.

The Year Book in French is increasingly demanded. Of late years (1891-98) there remain very few copies, and of 1891, 1893, 1894, 1895, 1896, 1897, 1900 and 1901, none at all.

There has been a very considerable demand for other publications of the statistical division. The criminal statistics have been sought after by writers of other lands as well as by students in Canada. The handbook on Canada and the pamphlet on pulp wood were in demand in the Wolverhampton and Cork exhibitions, and the pulp pamphlet continues in demand.

The correspondence of the statistical branch increases steadily from year to year, due in part to the large edition of the Year Book issued and to the increasing demand for it, and also to the ever increasing demand for general statistical information by the public.

The whole respectfully submitted,

SYDNEY A. FISHER,

Minister of Agriculture.

APPENDICES

PUBLIC HEALTH.

No. 1.

REPORT OF THE DIRECTOR GENERAL OF PUBLIC HEALTH.

F. MONTIZAMBERT, M.D.Ed., I.O.S., F.R.C.S., D.C.L.

OCTOBER 31, 1903.

SIR,—I have the honour to submit this my annual report as Director-General of Public Health to October 31, 1903.

This year, like the ones immediately preceding it, has been marked by the continued threatening of bubonic plague, cholera, and smallpox.

Strict measures, ordinary and special, have therefore been required for the sanitary protection of the country. The special measures explained at length in my last annual report have therefore been continued throughout most of the year.

Frontier inspection for smallpox on threatened ports of the international border, and extra inspection at some of the ports have been maintained more or less throughout the year, as the conditions to the south of us seemed to require.

Owing to the diminution of smallpox in the United States, the exemption from routine inspection of vessels arriving from New York and ports north of it was again allowed by your ministerial order from August 15 last. And from that date also most of the frontier medical quarantine inspections were also suspended.

Since that date there have been a few local outbreaks of smallpox south of us, on account of which you have maintained or restored the frontier quarantine inspections. These are at present being carried out at Northport (protecting Rossland and Nelson), at Grand Forks and at Greenwood, B.C., on account of smallpox at Spokane and in that part of the State of Washington; at and below Morden and Crystal City, Manitoba, on account of an outbreak of the disease in North Dakota; at Sault Ste. Marie, on account of smallpox in the lumber camps of Northern Michigan; and at McAdam Junction, N.B., on account of a recent occurrence of smallpox at and near Bangor, Maine.

On the Pacific side careful inspection of all arriving Asiatics has been carried out throughout the year. This includes the testing of the temperature and the examination of the glandular regions. Inspection of all vessels from San Francisco is continued on account of the presence of plague in that city. There have been five fatal cases of the disease there during this month.

Precautions as to funnels on hawsers, guarding of gang planks, &c., to prevent the embarkation of rats at ports of departure or their landing at our ports, have continued to be impressed upon the shipping companies.

Dominion Department of Public Health.—At the annual meeting of the Canadian Medical Association held at London, Ont., in August last, the following resolution was passed :—

Moved by Dr. Adam H. Wright, Toronto, and seconded by Mr. H. H. Chown, Winnipeg, that,

Whereas, this Association at its meeting in Montreal in 1902 placed itself on record by resolution to the effect that it is expedient that a Department of Public

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Health be created by the Dominion Government, and administered under the authority of one of the existing Ministers of the Crown.

It is further resolved at this meeting to again press upon the attention of the government that Canada is not preserving her status among the nations in this branch of the public service, and that it is anomalous to have the various matters connected with the administration of public health so far as it appertains to the Dominion Government, spread throughout four or five departments.

It is further resolved that in the opinion of this Association the profession of medicine in the country being actuated in this matter solely in the best interests of the public welfare and with an earnest wish to place Canada on a par with other civilized countries, is entitled to expect that the Hon. the Privy Council of Canada will at an early date take this question into its best consideration, so that by the time our Association meets again in the autumn of 1904, we will be made officially acquainted with a decision.

That a copy of this resolution be transmitted by the secretary to the Right Honourable the Prime Minister, to the Honourable the Minister of Agriculture and to the Honourable the Privy Council of Canada, through the Hon. R. W. Scott, Secretary of State.

Bubonic Plague.—This disease has occurred during the year in South Africa, Australia, Bolivia, Brazil, Chili, China, Egypt, Formosa, France, Germany, Hawaiian Islands, India, Japan, Mauritius, Mexico, New Caledonia, Peru, Philippine Islands, Turkey, Straits Settlements, and in San Francisco.

In Cape Colony it has been present in Port Elizabeth, East London, King Williamstown, Queenstown, Graaff-Reinet, Burghersdorp, Stockenström, and Riversdale. On the 5th instant these places were all clear of the disease except Port Elizabeth, where the report on that day was that two cases of plague had been discovered during the week, a European male, and a native male. At the Plague Hospital two European males died during the week. Two cases remained under treatment. In Cape Town and Harbour Board area 672 rats were examined during that week; none were found affected with the plague. This disease also occurred in Natal, in Durban and in Pietermaritzburg.

In Hong-Kong plague prevailed as it has of late years, especially during the May-September season. The disinfection at this port of departure has been continued throughout the year. The report of the government bacteriologist for last year shows that 147,839 rats were examined, and of these 2,015 were found to be infected with plague. The disease this year has been the worst since 1894. The early diagnosis of plague is not always easy, even when the number of alternative diagnoses is very limited. In the East, where very many possible causes of pyrexia exist, difficulties in diagnosis must constantly beset the path even of those who are constantly on the outlook for plague. In this relation a communication from a correspondent of the *British Medical Journal* in Hong Kong is interesting, since from his connection with one or two native charities he is in close touch with both the people and the plague. This gentleman says: 'As an example of our difficulties, I may quote a case I had this week. A woman was admitted to one of our charitable institutions with a temperature of 102°, a dry tongue, and slight abdominal pain. Careful search was at once made for malarial parasites, but none were found. Irregular pyrexia persisted for a week, and suddenly, on the seventh day after admission, she complained of pain in the neck. A bubo in the submaxillary region rapidly developed, and she died twenty-four hours later. Her case might easily have been one of enteric or any other form of fever, and though plague was suspected and the woman on that account was isolated, there was nothing distinctive in her symptoms to indicate it until the occurrence of the cervical pain and swelling. Among Europeans the disease most likely to be confounded with plague is malaria with fever of a remittent type, and one is

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greatly handicapped because, before sending for a doctor, the patient has invariably dosed himself with 30 grs. of quinine, and of course the chances are ten to one that a blood examination fails to reveal the presence of the plasmodium if the case is malarial. I had two such cases yesterday, in one of which the man actually had an enlarged femoral gland which, however, I was able to trace to the irritation of a suppurative lesion in his foot. When a bubo is present and superficial, serum may be withdrawn from it, and, after suitable staining, the plague bacillus may be found, but usually by the time such a bubo develops hopes of recovery are fast vanishing. Blood examination for the bacillus of plague is unfortunately almost invariably negative. We never go out here without taking with us the few necessities for making blood films, and we seldom return from the morning round of visits without two or three specimens. The daily plague returns at present number from 20 to 24 cases, but the actual number of cases is probably about four times this amount. The Chinese have the greatest horror of the thorough disinfection of their houses which is adopted by the sanitary authority, so that a Celestial no sooner gets fever than he packs up and takes the first boat to Canton, and, if he does not die on the ship *en route*, he usually succumbs shortly after his arrival.' These facts coming directly from one battling on the spot with this terrible scourge are highly instructive, and bear gratifying testimony to the care with which cases are investigated and the enthusiasm with which in Hong Kong the most recent and approved methods of research are adapted to the requirements of everyday practice.

At its meeting on June 4 the Sanitary Board reaffirmed its resolution to recommend the closing of the Chinese theatres during the plague season, instead of adopting the counter-recommendation—that they should merely be disinfected, and the audience obliged to wear feet coverings. This resolution was only carried by the casting vote of the president, the Hon. Dr. J. M. Atkinson, all the native members of the board being opposed to it.

It was also resolved to appoint a sub-committee to go again into the methods of disinfection, &c., employed, and see if they could not be modified in some way so as to lessen the temptation to the people to 'dump' their dead in the streets. The object of this 'dumping' is to avoid the disinfection and cleansing of their houses, to which the Chinese population have the strongest objection, so that if deaths occur from plague in their homes they secretly deposit the bodies in the streets. The number of bodies so dumped has steadily increased in every plague season, and represents 37.5 per cent of all known deaths this year.

A further decision was to recommend a Clayton sulphur dioxide apparatus for the disinfection of ships. This motion again was only carried by the casting vote of the president. The latter also made a communication as to investigations that are being made as to the possibility of infection being conveyed by food, especially in connection with fowls, some of which on sale in the market had been discovered to be plague infected. The Chinese, it was stated, prefer to eat fowls only half cooked, and use their entrails as a relish to rice. This inquiry is not yet complete. In the market 5 ducks, a chicken and a quail were discovered, all of which had died from plague. The birds had apparently been infected from the basement dwellings in the market, and these dwellings will no longer be allowed to be used. In this connection it may be pointed out that Dr. W. J. Simpson, during his recent visit to the colony, showed that monkeys, pigs, calves, sheep, hens, geese, ducks, turkeys and pigeons contracted the disease by feeding on infected material. These facts have a bearing on the mode of infection in man, and the prevalent view that he acquires plague mainly by inoculation. The fact that such a variety of animals can acquire the disease from their food suggests that he may also be so infected.

In China and in many oriental countries the domestic animals, such as fowls and pigs, live in close proximity to human beings, so close in fact that they are often under the same roof, and housed or allowed to wander about in the same apartment.

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The consequence is that whether the human beings or the animals contract plague first either may infect the other, for each is liable to the disease. In this way the disease becomes endemic in a particular house or apartment, whilst other houses or apartments close by are free from plague.

Our attention has perhaps been too closely bestowed upon rats as the carriers of plague; for whilst pursuing that theory we have neglected the facts now brought to our notice that any or probably all domestic animals do suffer from the disease, and that a multitude of other foci of infection are at hand.

Of acute and chronic forms of plague in animals the latter is the more interesting from an epidemiological point of view. Professor Simpson finds that pigs may suffer from plague for weeks without betraying any symptoms of illness. He tells us that pigs with plague remain in apparently good health, even when their temperature is 103° F. or more; and it is only by carefully recording their temperatures that we have any evidence that they have departed from the normal. For three or four or more weeks the pig may suffer from high fever after contracting plague, but until a few hours before death it gives no sign or symptom of illness.

Turkeys may live after being infected for as long as 44 days, ducks for 54 days, geese for 35 days, sheep for 34 days, and so on. During all this time, however, the animals are giving off plague bacilli in their fæces and urine and infecting the parasites which inhabit their skin and its coverings. Men and animals which are brought into intimate contact with them are thus exposed to infection.

These new facts in connection with plague help us to understand its persistency, its endemicity, and the difficulty of its eradication, for it would appear that every living thing in proximity with a plague focus may contract the disease. The transmission of plague by ships is, in the light thrown on the subject by recent facts, keenly brought home to us. At plague-infected seaports every kind of device has been practised to prevent rats getting from the infected shore to the ship or from the infected ship to the shore. But whilst guarding against rats, the fowls, geese, ducks, turkeys, sheep and pigs may have been brought on board for purposes of consumption by the crew or passengers, or for transmission from port to port. Each and all of these animals, however, may be infected, suffering from chronic plague, and yet giving no sign or symptom of illness. The rats in the ship may be free from plague until the fowls come on board, yet it is only when these rodents die that plague is suspected. The discussion as to whether the rats are infected first and man afterwards, or vice versa, has raged for several years, but the varying evidence brought forward may find its solution in the fact that it was some other animal that infected both, and the rat and man developed the disease almost contemporaneously. Plague has frequently occurred whilst the rat remained free, as proved by the most careful bacteriological inquiry, and epidemiologists have, in their conviction that the rat and the rat only is the carrier of the disease, been led astray in their investigation. Plague appeared in Glasgow, but no rats were found infected until twelve months afterwards, and there can be no doubt that some other animal from on board a ship sailing from a plague-infected port was the conveyer of the disease.

The prophylaxis of plague, therefore, assumes a much wider proportion than has hitherto been bestowed upon it. Any and every animal received on board ship may possibly convey plague; it may be suffering from plague and yet show no signs of illness. The fowl will readily eat its food, and the pig's appetite will continue as voracious as ever even when the temperature of the former may be 107° F., and that of the latter 104° to 105° .

These are problems which the sanitary officer of the port must at once take in hand if plague is to be controlled. The one evidence of plague in animals short of examining the blood or excretions of the animal for plague bacilli is that of temperature; so that it comes to this, that the temperature of every animal previous to being received on board from a plague-infected port should be tested, and steps taken

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to weed out the apyrexia from the pyrexia—a laborious process no doubt, but it is the only means known to us at present how to separate the infected from the healthy. Not only, however, is it domestic animals that are known to be infected. The marmot in Mongolia was proved by Clemow to suffer from plague; bats were found to be infected in Naples; pigeons, which were until recently held to be immune, are now known to succumb readily to the disease; and the story of the crow flying over Rome, falling dead in the street, and infecting children with plague who picked it up, is readily explainable in the light of modern research.

What is wanted is a ready means of diagnosing plague in animals; for to take the temperature of each pig of a large consignment, or to examine the blood for plague bacilli is an ordeal the best equipped port officers could not possibly face.

Dr. F. W. Clarke, the medical officer of health of Hong Kong, in his report for 1902, published in the *Government Gazette*, states that ‘the total number of cases of infectious diseases reported by registered medical practitioners during the year was 1,171, of which no less than 572 were bubonic plague and 410 were cholera.’ Over 200 Chinese connected with the sanitary staff were inoculated with Haffkine’s antiplague serum, with the result that not a single case occurred among the staff, whereas in the previous year out of 30 ratcatchers 7 are known to have died of plague, while 5 others left the colony sick, two of whom died at their homes in China. ‘The results, therefore, of the Haffkine inoculation, coupled with strict discipline in regard to cleanliness and the wearing of leather boots when on duty were eminently satisfactory as regards the plague staff.’ Clean bills of health have again been issued from Hong Kong from the 27th instant.

The Philippine Islands. Plague was present during the year at Manila and Cebu. The special correspondent of the *Medical Record* writes as follows:—

‘Sanitary conditions in Hong Kong have a close relation to the public health in the Philippines, by reason of the great amount of traffic between Hong Kong and Manila and the short distance between these ports. Steamers make this distance, 600 miles, in two days, and sailing vessels in twice that time. Many Chinese are continually going back and forth, and much merchandise and foodstuffs are constantly being brought into Manila for their use. The occasional importation of plague infection into Manila can thus scarcely be prevented by ordinary methods of quarantine. While the late development of plague and cholera in Manila was undoubtedly due to relative inefficiency of the Manila quarantine service, the quarantine officials cannot be fairly judged as to the quality of their work, except in the light of a full knowledge of the geographical relations and existing sanitary conditions of Eastern Asia. That Dr. Perry and his excellent assistants were able to keep the original infections out for so long a time, and to prevent the introduction of new infections since these diseases first gained entrance, is just cause for hearty praise. If plague could not be kept out of San Francisco—three weeks from infected points by the fastest steamers and in communication with them by only relatively few boats—it was scarcely to be expected that Manila, within easy reach by small boats of a hundred infected points, and with a quarantine service which the shortness of the time since the abolition of Spanish sovereignty scarcely permitted to be brought into a perfected condition, would be able to escape unscathed. Japan, with its highly efficient and thoroughly organized quarantine service, lying at a greater distance from the infected ports, possessing a climate far less favourable than that of the Philippines for the multiplication of germ life, and with a peaceful population possessing the highest respect for laws and official control, has suffered to no small extent from both plague and cholera. Bearing these facts in mind, one cannot but feel that the quarantine officers in the Philippines deserve the highest credit for what they have accomplished in spite of the geographical and climatic obstacles already mentioned, combined with the existence in the Philippines, until lately, of a state of insurrection and anarchy.

‘The newly constructed quarantine station for Manila, located at Mariveles, at the entrance to Manila Bay, is most comprehensive in plan and complete in detail

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and equipment, and is a monument to the energy and ability of Passed Assistant Surgeon Perry, U. S. M. H. S., who carried out the work of its construction during the troublous times of the insurrection, and in addition to the performance of his arduous duties as health officer of the port of Manila. The cost of construction of the buildings of the disinfecting station, isolation camp, and hospital amounted to \$210,000. Under Spanish rule a quarantine station had been maintained at Mariveles, but the buildings were so old and the station so poorly planned and equipped as to be of little value in the work of reconstruction. Of these old Spanish buildings but two have been preserved, and these are used for offices, storerooms, and officers' quarters.

'Mariveles quarantine is distant thirty miles from Manila and directly inside the entrance to Manila Bay. It is located at the end of Mariveles Bay, a small harbour completely sheltered on nearly all sides by high mountains, having a sandy bottom, and affording perfect protection and anchorage. At low water there is a depth of 35 feet at the end of the short station wharf, so that the largest vessels can readily come alongside the disinfecting station. There is an abundant water supply of unimpeachable quality, piped from an uninhabited and uncultivated water shed three and a half miles away and delivered under sufficient pressure to throw water over any of the buildings of the station in case of fire. The disinfecting plant is completely equipped with bichloride tank, sulphur furnaces, fixed and portable formaldehyde generators, and two steam sterilizing chambers.

'There are ample disrobing rooms for the steerage passengers, and fifty shower baths for this class of passengers. On leaving the shower baths they receive cotton pyjama suits and pass into the waiting-room, where they remain during the disinfection of their clothing. Before entering the bath-house each passenger receives a numbered tag, which he ties around his neck during bathing. Any valuables he may have are placed in a box having the same number, and he is given a sack bearing the same number, into which his clothing is put after disrobing, and in which it is carried by an attendant to the disinfecting chamber, where it is exposed for twenty minutes to superheated steam at 240° F. At the end of this time the sack is taken out and returned to the passenger, who has finished his bath in the meantime. By this means articles are promptly returned to the owner without the loss or confusion incident to their becoming mixed with articles belonging to others. Shoes are disinfected by being dipped in bichloride solution. As the Chinese are particularly averse to bathing, attendants remain in the steerage bath-room to see that each person properly bathes himself with a sufficient use of soap. Two smaller bath-houses are provided for the bathing of first and second class passengers. In these the arrangement is somewhat different, there being a number of small disrobing and dressing rooms with the shower baths between. As some of the first-class passengers seem to delight in trying to evade the bath, an arrangement is being tested by which a passenger, on entering the bath-room, steps on a movable floor, which turns on the shower bath automatically, and thoroughly wets the passenger, who might then just as well continue the sometimes involuntary bath to which he has been subjected. General waiting-rooms, with comfortable chairs and reading matter, are provided in these smaller bath-houses. As the whole plant is built on piles over the waters of the bay, the dirty bath water, excreta, &c., create no difficulty as to their disposal. Two medical officers and about twenty-five men, of whom sixteen are Filipinos, form the personnel attached to the station. To show the efficiency of its operation, it may be mentioned that a large army transport with more than a thousand passengers aboard has been disinfected throughout in but ten hours.

'At the head of the wharf on shore are located the buildings of the detention camp hospital and offices. These, like the buildings of the disinfecting station, are well constructed of hardwood. The building for first-class passengers is of two stories, well ventilated and provided with small bed-rooms on each side of central corridors, each room having two beds and a window. The buildings for the steerage passengers

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are so arranged as to divide the passengers into five groups of two hundred persons each, no one group having any contact with another. The buildings are comfortable one-story affairs, with the kitchen in a semi-detached out-building. Bunks are constructed in three tiers, and split bamboo frames rest inside these bunks and form very comfortable beds. High fences of barbed wire separate each group, and these are so laid out that a single watchman guards the yards of all five groups. A small army post is located just outside the quarantine reservation, and the soldiers are used for guard duty and to enforce the maintenance of quarantine. The whole station is amply shaded and very attractive, while the cool sea breeze, which always blows, makes the climate far more pleasant than that of Manila. The Filipino attendants are said to be very efficient, even more so than the ordinary class of whites, as the pay given is so high as to secure the very best class of native labour. As Mariveles is shut in by an almost uninhabited and mountainous country, there is practically no communication by land, and its site for a quarantine station could hardly be improved upon. The station cannot be commended too highly.'

Japan.—While on the subject of quarantine in this part of the world, mention must be made of the methods in vogue in up-to-date Japan. The quarantine regulations of that country are largely modelled after those of the United States, as are their quarantine stations. The quarantine rules are most strict, as they necessarily must be with Chinese and Korean pestilence centres only two or three days away by steamer, and much commerce being carried on by the Japanese with ports on the mainland. The Japanese are thoroughly imbued with the idea that it costs less in lives and money to keep out a disease than to stamp it out after it has once secured a foothold. For this reason, and possibly also because they feel that their modern civilization is on test with foreign nations, they carry out their quarantine rules with strictest detail. On entering a Japanese harbour a boatload of quarantine doctors comes alongside, their quarantine launch being equipped with microscope and accessories for the purpose of making any desired bacteriological examination on the spot. Besides their own language, each of these doctors is able to speak at least one foreign tongue, so that English, French, German, Russian, Chinese and other nationalities can be questioned in their own language. Every passenger and member of the crew is lined up on deck, called by name, and the total number verified. While this is going on, the other physicians pass along the line, feel every man's pulse, make him put out his tongue, and if he shows any appearance of sickness they produce thermometers and take his temperature.

Nothing escapes them, and it is useless to try the old dodge of sending a man around the deck-house to be counted twice, for the place where every man not in the rank can be found must be stated, and these men are inspected and their condition verified while the count on deck is going on. It is also useless to expect that the condition of a sick man, sent on deck, will not be noted. Such men are set aside and carefully gone over by several of the quarantine doctors in a way which shows their proficiency in the latest methods of diagnosis and familiarity with modern diagnostic appliances. The disinfecting stations, as already mentioned, are modelled after those of the United States, but the Japanese go one better in that, after the bath, any drinks desired, except champagne, are served to the first-class passengers at the expense of the Japanese government. So carefully are the quarantine regulations observed in Japan that complete inspection of the crew is carried out even where vessels are making short runs from one port in Japan to another. Thus a vessel touching at Nagasaki and arriving at Kobe a day later would be again completely inspected, and returning at once to Nagasaki would be reinspected at the latter port with every detail required in the original inspection made on arrival from Shanghai or other infected port.

India.—India has this year suffered from the most serious epidemic experienced by that country since the disease appeared in Bombay in 1896. In March and April

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last the deaths from plague in India reached the enormous total of 5,000 daily. The official British figures are as follows : in 1897 the death list was 56,000. In 1898 it was 118,000. In 1899 it was 135,000. In 1900 it dropped to 93,000. In 1901 it was 274,000, and in 1902 it was 577,000. This makes the deadly total for six years of 1,253,000. But that is not all. During the first three months of the present year the deaths in India from plague were 331,000. Every year for seven years plague has diminished in May, and has remained at a low level throughout the summer months. Judging, however, from past experience, a recrudescence of this disease with increased virulence may be looked for in the winter and spring of 1903-4.

Mexico.—Plague occurred in Mexico during this year at Mazalan, Sequeros, Bogio, Teapole Ranch, and Villa Union. The deaths are stated to have been 330.

Brazil.—Plague reappeared in Rio de Janeiro last month, some 71 plague stricken patients having been in the Jurujaba Hospital on the 18th ultimo.

Chile.—Plague has been present in Valparaiso, Pisagua, Iquique, and nearly all the seaport towns.

Peru.—Plague appeared at the port of Pisco in May last, and also in Callao. It is supposed to have been brought in the rice in the cargo of the ss. *Serapis* from India.

France.—On September 9, five deaths were reported to have occurred at Marseilles from plague, and 16 cases were in addition stated to be under treatment for the same disease. On September 10, 29 cases of plague were officially announced by the authorities to exist. The outbreak occurred in a cardboard factory situated at Barnahé, a suburb of Marseilles, and is attributed to the importation of a number of bales of rags from Smyrna. In the rags a few dead rats were found, and the persons first infected were those engaged in handling the bales. Immediate steps were taken to prevent the spread of the disease, and there seems every reason to hope and believe that the outbreak has been suppressed. It is to be noted that the port from which the vessel with bales of rags on board hailed—namely, Smyrna—is a Mediterranean port. Plague was reported from Smyrna some time ago, but for several months past it has not been officially stated that plague existed there or in the neighbourhood. The factory was burned and all employed about the place were carried to a quarantine station. Two of the nurses tending the plague patients contracted the disease.

Berlin.—Dr. Milan Sachs, a young Viennese physician, died in June from plague in Berlin. He had studied the disease at Agram and other Balkan cities, and came to Berlin to continue his researches at the Bacteriological Institute, where he became infected with the plague. He was transferred to an isolated barrack, where he died June 5. The authorities adopted rigorous measures to prevent a spread of the plague. All the household effects of the family with which Dr. Sachs boarded were confiscated and burned, and all persons who came in contact with the dead man were segregated for observation. In consequence of this death the government decided to issue a decree forbidding further experiments with plague germs, the risk of spreading infection being considered more dangerous to the public health than the knowledge gained in studying the deadly microbes justifies. The decree forbidding further experiments was determined upon at a conference at the Ministry of Education of the sanitary and police authorities, in which the Emperor's physician, Dr. Leuthold, Professor Renvers, and other noted specialists participated. Dr. Sachs was sent to Berlin by the Austrian government, which intended to use his services in perfecting the sanitary arrangements in Bukovina.

All the persons who attended Dr. Milan Sachs during his illness were treated with preventive injections of antiplague serum, but one of them developed the disease. Possibly on account of the preventive injections, it had a very mild course and recovery was soon complete. The entire furnishings of the apartment where Dr. Sachs had lodged were taken to the disinfecting headquarters and burnt.

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San Francisco.—The Chinese district is presently undergoing a thorough systematic inspection, disinfection and cleansing under the direction of the officers of the U. S. P. H. and M. H. S. The agreement between the local board and the state board and the federal government went into effect February 9, 1903, and the work commenced will be maintained for at least one year from said date. In accordance with their plan, a body of picked physicians, interpreters, inspectors and detectives are daily inspecting the streets and houses, together with their families or inmates, sick or well, throughout the Chinese district. The sanitary condition and arrangement of each structure are examined room by room; the Chinese, sick and well, carefully observed; a corps of men, headed by an experienced disinfecter, supervised by federal officers, disinfect with carbolic solution all rooms, hallways, alleys, and areas requiring same. The plumbing in the houses throughout the district is under the careful inspection of trained inspectors, and alterations and improvements are required whenever needed. This board, acting upon the complaint and report of the inspection force, has condemned and will continue the vacation and condemnation of unsanitary and unsafe structures. The streets and alleys of the Chinese districts are three times a week sprinkled by improved methods with a solution of corrosive sublimate, sewers are flushed throughout the district twice a week, chloride of lime distributed under medical inspection and instruction, wherever it may be required.

Under the supervision of experienced sewer men, trays, especially prepared, containing a preparation of phosphorized paste, are widely distributed throughout the sewers in the Chinese district, and the rats are using this bait in large quantities, and with fatal results. In addition to this specially constructed traps are set in sewers and above ground in the Chinese district and along the water front, and the captured rats, as well as those found dead in the sewers, streets and houses, are submitted to examination by the bacteriologist of the Public Health and Marine Hospital Service and city bacteriologists.

Following is the record of work in Chinatown for week ended October 24:—

Building reinspected.. . . .	130
Rooms.. . . .	1,030
Persons inspected.. . . .	1,206
Sick.... .	34
Sick prescribed for at oriental dispensary.. . . .	17
Dead examined.... .	8
Necropsies..... .	8
Provisional diagnosis of pest..... .	3
Rats examined bacteriologically..... .	11
Places limed and disinfected.. . . .	750
Times streets swept..... .	3
Sewers flushed..... .	17
Notices to abate plumbing nuisances.... .	30
Plumbing nuisances abated..... .	9
Undergoing abatement.... .	19
Total number of plumbing inspections.... .	89

PLAGUE in the United States, as reported to the Surgeon-General, Public Health and Marine-Hospital Service, December 27, 1902, to October 30, 1903.

Place.	Date.	Cases.	Deaths.
California—			
San Francisco.	Dec. 11	1	1
"	Mar. 16	1	1
"	June 5	1	1
"	July 15	1	1
"	July 19	1	1
"	July 20	1	1
"	July 29	1	1
"	Aug. 9	1	1
"	Aug. 21	1	1
"	Sept. 13	1	1
"	Oct. 7	1	1
"	Oct. 20	1	1
"	Oct. 23	1	1
"	Oct. 23	1	1
"	Oct. 29	1	1

A summary of cases since March, 1900, when the first case was officially reported, is as follows: Calendar year 1900, cases, 22; deaths, 22. Calendar year 1901, cases, 30; deaths, 25. Calendar year 1902, cases, 41; deaths, 41.

Total cases of plague from January 1 to October 30, 1903, 14.

Total cases San Francisco to date, 107; deaths, 102.

British Columbia.—No case of bubonic plague has been reported or observed at the William Head quarantine station. As an instance, however, of the continuous threatening of this disease at British Columbia ports, may be mentioned the circumstances connected with a voyage of the Nippon Yusen Kaisha liner the ss. *Kaga Maru* in June last. This vessel left Seattle May 30, and upon her arrival at Yokohama one of the crew, a Japanese, who had been ill for two days, was still suffering. As the symptoms were suspicious, the vessel was not allowed to enter the harbour, and the man was kept under observation for 48 hours. An examination revealed the presence of plague bacilli. In order to confirm the diagnosis a culture was made of the bacilli, when all doubts were removed as to the nature of the disease. The vessel was immediately ordered to the quarantine station for ten days' detention.

The passengers travelling by the *Kaga Maru* numbered 13 in the saloon, 7 second class and 48 steerage. Out of the 13 saloon passengers 7 were foreigners, while there were 3 foreigners in the second-class. The majority of the steerage passengers were Chinese. The cargo was disinfected at Nagahama prior to its being landed and delivered.

The large quantity of flour carried on board the *Kaga Maru* was exposed to the sun before delivery, while other articles were disinfected with carbolic acid.

In connection with the quarantining of the *Kaga Maru*, the *Japan Herald* says: 'The outbreak of plague on the *Kaga Maru* raises one or two interesting questions. The *Kaga Maru* left Seattle on May 30, and arrived here on the 15th instant. She was thus 14 clear days between ports. It is generally calculated that a case of plague takes from 7 to 10 days to develop, and if this be correct the man who is now suffering from the disease was infected on board. Otherwise Seattle must be considered as an infected port, a condition which there is no reason to suppose correct. On the other hand, it is difficult to understand, if the vessel was infected on her outward voyage, why only one of those on board should be attacked and why such a long time should have elapsed before the disease manifested itself. If the vessel was infected on her outward trip the disease must have been spread by the rats on board, which

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was presumably the way the disease was carried to Sydney some two or three years ago. The steamer did not call at the ocean docks at Victoria, B.C., when bound outward as usual, her passengers being put on board in the Royal Roads.

The ss. *Hyades* lost her head steward from plague while at Hong Kong in April, and the ss. *Indrasamha* landed a case of plague at quarantine in Keeling, Formosa, in July. Both of these vessels, like the *Kaga Maru*, ply to British Columbia ports.

Plague and fleas.—Simond's theory that fleas travelling from rats which have died from plague have frequently bitten human beings and thereby disseminated the disease has up to the present met with little favour among those who have closely investigated the malady. Simond's view, as set forth in *Annales de l'Institut Pasteur*, Vol. XII., 1898, p. 628, is as follows: 'The idea of transmission by means of a parasite, which would seem to be the conclusion drawn from clinical experience, is in accordance with the invasion of sick rats by fleas, which several hours after death abandon the cadavers to attack other animals and man.' This is confirmed (1) by the presence of the specific microbe in the intestinal contents of the flea; (2) by other certain peculiarities of transmission from rat to man, and from man to man, in which latter case it is possible that other parasites, more particularly the bedbug, may intervene; (3) by the possibility of the transmission of plague to a healthy rat by his cohabitation with an infected rat with fleas, when such cohabitation of healthy rat and flealess infected rat is uniformly innocuous. The great stumbling-block to an acceptance of Simond's theory has been the assertion made by several authorities—and especially by Professor Galli Valerio—that fleas from rats will not bite human beings. Now, however, Dr. Frank Tidswell, of Sydney, well known for his studies and reports on plague, has come forward with the statement that some of the fleas which infest rats will bite human beings. He writes thus in the *British Medical Journal*, June 27: 'In opposition to Simond's hypothesis that bubonic plague is disseminated by fleas from infected rats, it has been urged that the fleas of rats will not bite human beings. Simond himself, while admitting his inability to pronounce upon the species of fleas found by him upon rats, nevertheless clearly states that they bit human beings upon which they were placed. Prof. Galli Valerio, of Lausanne, has reported that the species of fleas found by him upon rats are *Typhlopsylla musculi* and *Pulex fasciatus*, and that neither of them will bite man. Simond's observations were made in India and Valerio's in Europe, and it seemed by no means improbable that their conflicting results were due to the fleas found by them being of different species. It does not follow that the fleas harboured by rats in two widely different places would be exclusively of the same species. With a view to determine this point, a collection of fleas was made from the rats coming under my examination during the recent epidemic of plague at Sydney. Of 100 fleas obtained 10 were identified as *Pulex fasciatus*, 8 as *Typhlopsylla musculi*, 1 as *Pulex serraticeps*, and 81 as *Pulex pallidus*. It will be seen that no less than four species were represented, and most abundantly one (*pallidus*) not hitherto mentioned, as far as I am aware, as occurring on ordinary rats. Its stated hosts are *Mus albipes* of Socotra and *Herpestes ichneumon* of Egypt. This species bit in laboratory trials, as did also *Pulex fasciatus* upon one occasion. *Pulex serraticeps* is well known to attack man. The remaining species, *Typhlopsylla musculi*, did not bite us.' Dr. Tidswell announces that an official report on the matter will be forthcoming soon, and remarks that in the meantime it may be noted that the results of his observations tend to remove an otherwise fatal objection to Simond's views.

Danysz's Virus.—Assistant Surgeon Donald H. Currie reports to the Surgeon General of the United States Public Health and Marine Hospital Service, March 31, as follows:—'February 2, I received two tubes of this virus from the Pasteur Vaccine Company. February 4, I mixed one tube with half pound of rye bread, in accordance with the directions printed on the tube, and fed it to 9 rats. February 13, the rats began to sicken, so I separated them, putting them into different cages, each rat into

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one cage. February 15, all rats had sickened in series 1. In these cages I placed 22 other rats and named these latter, series 2. On February 17, 2 rats of series 1 died with typhimurium infection. From that date to February 28, inclusive, 8 of the original 9 rats died from the same cause, all of them in series 1. From February 20 to March 1, 5 rats of series 2 died. During this time all of series 2 were more or less sick, but 17 recovered. On March 13 all the rats which had not died had made a complete recovery, and had gained in weight to that before infection. They were chloroformed on this date.

From the above it will be seen that in series 1, that is to say, those rats which actually ate the virus, there was a mortality of 88·7 per cent, which would compare favourable with any of the ordinary poisons, such as phosphorus, &c., without any danger of poisoning other animals and human beings, as is the case in inorganic and organic poisons. In series 2, however, the mortality, as will be seen, was only 22·7 per cent, and when it is taken into consideration that those rats were confined in close quarters, which would not be attainable under natural conditions, it is probable that there would be little or no transmission of the disease in wild rats when at large. An interesting thing in this connection was noted, namely, that the healthy rats when placed in with the infected ones, avoided the latter as much as possible. The conclusions which this experiment would lead one to draw are that the virus is efficient when actually fed to the rats, as is done with other poisons, and that it has not the dangers which phosphorus and arsenic possess; but the claim that the disease would be transmitted from rat to rat is probably only admissible in the laboratory, and is therefore impracticable of application in the destruction of the rats of a city.

Destruction of rats on shipboard.—Nocht, harbour physician, and Giemsa, chemist, both of Hamburg, recognizing the important part played by rats in the transmission of plague, have performed a large number of experiments with a view of determining the most effectual means of destroying them in the holds of ships. The objections to the use of edible poisons are obvious, and of rat-killing animals, ferrets are alone really useful. They have, however, distinct disadvantages: First, they attack other animals, particularly birds; secondly, they require extreme care, especially as regards feeding; thirdly, they have but little resisting power against cold; and lastly, they cannot penetrate into corners quite so well as their prey. It thus appears necessary to kill the rats by the means of a poisonous vapour; for this purpose burning sulphur has been employed, at least 10 kilog. being required for every 1,000 c. m. of storage space. In order to obviate the danger of fire caused by the combustion within a closed space, bombs of sulphurous acid have been used, and also a substance called piktolin, which consists of a mixture of sulphurous and carbonic acids. The disadvantages of this are, first, that the hold must be almost cleared out before it is introduced, and, secondly, that it must be led on through a complicated series of tubes, as otherwise it does not diffuse equally. Piktolin acts much more rapidly than burning sulphur, but is about twice as dear. Recently the Clayton Fire Extinguishing and Ventilating Company has introduced an apparatus in which sulphur is burnt at a high temperature, and sulphurous together with a little sulphuric acid produced. The process, which is one which has been in use for disinfecting purposes for years, occupies some fifteen hours, and requires the combustion of about 1 lb. of sulphur per 250 cubic feet of hold requiring to be cleared. It is claimed that this method, while absolutely fatal to the rats, does not injure the cargo; but the authors consider that this is only true of dry goods. Many substances, particularly fruit and other provisions, absorb the gases, and are thereby damaged. Moreover, the repeated use of the apparatus is not without harmful influence upon the vessel itself. Further experiments were carried on with carbonic acid gas. It was found that 30 per cent of this must be present in the atmosphere before the rats are killed with certainty. It is best employed in the liquid form in steel cylinders, but is very expensive, and moreover so slow in its action, that the animals frequently have time to escape from its influence to places of safety. The writers finally come to the conclusion that the sole agent, by the use of which all the

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preceding objections can be obviated, is carbon monoxide. This has no smell, exerts no chemical action upon the cargo or the vessel, is cheaply manufactured, and rapidly kills rats and mice. The use of this gas was suggested by Haldane, but the authors consider that their method of producing it is safer as regards the risk of explosion. They manufacture it by heating coke in a generator and driving through the upper surface a current of compressed air either alone or alternately with aqueous vapour. By this means a gas is produced consisting on an average of 5 volumes of carbon monoxide, 18 of dioxide and 77 of nitrogen. The gas is introduced into the hold by tubes passed down through the ventilators, and a volume equal to about three-quarters of the cubic contents to be cleared is employed. There is no difficulty in allowing the escape of the gas by opening the ventilators when it has done its work; if necessary men in diving helmets can be sent to open the windows. Goods of all kinds after twelve hours' exposure to the gas were found quite unaltered. Details are given of experiments made upon various ships, in all of which every rat and mouse succumbed to the gas. In one particular case several of these animals were found to be infected with plague. The cost of the method is comparatively moderate; the original apparatus for a large harbour would come to some £2,000, but that having once been set up, each individual ship can be cleared for from £3 to £4. If further experiments confirm these views, it may become expedient for us to install the apparatus for the generation of this gas at our stations and harbours for the destruction of the plague-carrying rat on shipboard.

Haffkine's Prophylactic.—In answer to the questions which have been raised:—

1. As to the length of time during which Haffkine's prophylactic renders a person immune.
2. As to the length of time before it acts.
3. Whether it is injurious to those who are incubating the disease?
4. Why, in spite of England's systematic efforts to exterminate the plague, so little has been accomplished?
5. Whether the inoculation increases the liability to other diseases?
6. Whether Haffkine's prophylactic is of real value in reducing the plague mortality, since the latest reports from Bombay seem to show an increase in the plague death rate?

Dr. B. R. Slaughter, of Washington, D.C., sums up the benefits of the prophylactic as follows:—

- 1st. It renders a person immune for 3 months.
- 2nd. It acts within 24 hours.
- 3rd. When inoculation is given in incubation stage of disease, that is, before signs of plague appear, it has, in many cases, the power to abort the disease.
- 4th. Inoculation has no effect on other diseases, except, possibly, eczema, which appears to be benefited by it.
- 5th. Inoculation confers a high degree of immunity, and greatly reduces the number of plague attacks.
- 6th. When, in spite of inoculation, a person is attacked, his chances of recovery are greatly increased.

The 4th of the above questions, and incidentally the last portion of the 6th, Dr. Slaughter answers as follows:—

4. Why in spite of England's persistent efforts to exterminate the plague, has so little been accomplished? For this there are several reasons.

1st, because the earnest and intelligent work which is being done covers, after all, a comparatively small area of the great Indian empire.

2nd, because, even if every case of plague in a town is cured to-day (after general inoculation the plague disappears in from 30 to 47 days), and the villagers persuaded to adopt the most hygienic conditions of living, by next year, their fright having passed, they will grow lax and indifferent. Many who have learned something of hygiene will

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have left on business or pilgrimage, and others will have come in from neighbouring towns bringing with them utterly unhygienic customs. One of these that assists in rapidly spreading the plague in pneumonic cases is that the patients expectorate into the hands of their sympathetic attendants.

3rd. Natives who fly on the outbreak of the plague and live in shacks built on moist ground and among whom ambulant cases develop, when they return bring with them attenuated bacilli, which under favourable conditions regain their virulence, and precipitate a new epidemic as soon as winter causes the people to come again in to close quarters.

4th. There will also be Mohammedans returning from Mecca, and Hindus from Benares, who will have been in contact with plague sufferers from Egypt, or other parts of the orient, on the one hand, or with plague contacts from thousands of native villages on the other. Since Dr. Calvert reports that the bacillus remains viable and virulent on dried pulverized organs of animals dead of the plague for as long as 48 days, and on paper or silk, in a room at ordinary temperature in the sunlight, for 18 days, it is easy to realize how readily infection is carried in the dark folds of oriental garments, for it has been demonstrated that bedding and clothing may harbour bacilli for months, and in experiments they have been kept alive in crash for 97 days.

In the laboratory experiments conducted by Dr. Rosenau, of the Public Health and Marine Hospital Service, and director of the hygienic laboratory at Washington, he discovered that the plague bacillus lived and remained virulent 16 days in one case and 96 in another when abundantly inoculated into water containing organic matter. Now, every one familiar with India and her numerous sacred tanks and wells, sheltered from the sun, and fetid with the decaying floral gifts constantly thrown into the waters by devotees, will at once recognize that here is one of the perennial sources of the bacillus pestis. Dr. Rosenau found further that 'the bacilli are long kept alive in moist, cool earth,' and as the dark, native huts are almost invariably built directly upon the ground, which is kept moist by water from these same tanks used in pouring libations to the household gods, it will be seen that all the conditions which laboratory research shows to be most favourable to the growth and preservation of the bacilli are actually and constantly in existence in the country most devastated by them.

These are some of the reasons why the work of the British government in India has to be done over again every year.

Cholera.—Lord Cromer quotes the following extract from a report by Sir Horace Pinching, dated February 3, 1903:—

'If further evidence were needed to prove that cholera is chiefly a water-borne disease, the late epidemic in Egypt afforded ample.

'During the period since the 1895-6 epidemic of cholera, a certain amount of work has been done in the larger provincial towns to protect as much as possible the water supply from pollution, and some have been supplied with water drawn from deep tube wells. In none of these towns did the disease assume an epidemic form; cases occurred in most of them, but the majority were imported from adjoining villages.

'Several gangs of men were trained for the purpose of boring Abyssinian tube wells, and in villages where cholera broke out, which depended entirely on well water for drinking purposes, one of these gangs was sent on and several pipes were driven, and a supply of pure water for the village obtained. The rapid way in which the disease ceased in such villages was most marked.

'At the commencement of the epidemic, Birch Bey, of the Daira-Sanieh, very wisely had Abyssinian wells made in all the villages belonging to the Daira-Sanieh administration between Rodah and Bibeh, in Upper Egypt. These villages contain some 22,000 inhabitants, and, though the towns and villages all around them were more or less seriously infected, only 196 deaths took place from cholera among the

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villagers on the Daïra-Sanieh property. This immunity from the disease was no doubt due to the pure water supply, and the excellent control over the villages exercised by Birch Bey himself.

‘The villagers as a rule accepted most readily the water from the Abyssinian wells, and only in some cases were the pumps destroyed and the tubes wilfully filled with rubbish by the inhabitants.

‘At Keneh, situated some two miles from the river, and which formerly drew its water from wells and a stagnant backwater of the Nile, an engine, with pump, &c., was erected about eighteen months ago on the Nile. The result of this was very remarkable, only one case of cholera occurring in this town of 27,478 inhabitants, whereas during the epidemic of 1896 no less than 422 cases were registered.

‘In Medinet-el-Fayoum, where much has been done to prevent the Bahr Yousef becoming polluted, a similar result was observed, though not so marked, 368 cases occurring in that town in 1896 and only 87 in 1902. As the Bahr Yousef is the main supply for the whole Fayoum province, the diminution in comparison with 1896 was marked throughout this province, 2,183 occurring in 1896 and 1,001 in 1902.

‘In other towns, such as Assouan, Beni-Suef, Mit-Gamr, Zifta, &c., the same results were remarked.

‘During the epidemic of 1896, Cairo experienced a sharp recrudescence of the disease when the old Khalig was opened and the people began to take water for drinking purposes from this highly infected source. Since then the Khalig has been completely filled in; another canal, however, remained—the Boulakia, similar to the Khalig, in that it was dry the greater part of the year, and, while dry, served as a public latrine to the inhabitants of Boulac, the quarter through which it passed, which is one of the most crowded and dirty parts of the city.

‘Had this canal been filled with water during 1902, Cairo would no doubt have experienced a similar recrudescence of the disease to that of 1896, but at my earnest suggestion the part of the canal which passes through the city was filled up, and a new head made on the river for the purpose of leading water to that part of the canal outside the city which serves for irrigation purposes.

‘Great thanks are due to Mr. Webb, Mr. Langley, and to the other public works officials who carried out this work so promptly, as the Nile was rising rapidly at the time, and had not the work been taken in hand at once it would have been impossible to prevent the water from filtrating into the canals.’

Provision has been made for an annual expenditure of £E10,000 to provide Cairo with free taps, and an arrangement has been made with the Cairo Water Company to improve the quality and increase the supply by furnishing water from artesian wells. The government will contribute £E20,000 towards the cost of installing the new system.

The question of the water supply of Alexandria was still undecided when the report was drawn up, but it is stated that the system of rapid sand filtration appears to be best suited to all the circumstances of the case. Much has been done during the last five years to improve the water supply of other towns, but much remains to be done, though Lord Cromer anticipates that next year he may be able to state that a plan has been adopted.

At a meeting of the Manila Medical Society on the 7th of last month, Dr. R. P. Strong considered the subject of protective inoculation against cholera under several headings, briefly summarized as follows:—The work previously done on artificial immunity by Ferran, Haffkine, Kolle, Buchner, Metchnikoff, Roux and others was considered. While it is admitted that Haffkine’s method, when properly applied, gives rise to good immunity in the inoculated, the local reaction is too great for the method ever to come into general use. Subcutaneous injection of either living or dead cholera vibrios produces more marked general symptoms and local reaction than does the injection of either killed plague or typhoid bacilli. The location of the specific toxin was next considered and evidence brought forward to show that the substance existed

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as an integral part of the living organism, and was set free only by the death of the same. In the author's form of inoculation, the cholera 'receptors' were obtained from bodies of the bacteria by means of autolytic digestion. The proteolytic ferment produced by this organism brings about this result in a very satisfactory manner. This ferment is not destroyed at 60° C., and, therefore, the bacteria may be killed by careful heating from one to two hours and digested from two to five days by this ferment, and then passed through a Reichel filter. Such a filtrate when injected into animals gives rise to autotoxic, bactericidal and agglutinative substances in their blood serum, and, moreover, protects them from the injection of fatal doses of living cholera spirilla. As the local reaction produced is very mild, such a filtrate offers itself as a practical form of protective inoculation in man. This filtrate may be evaporated and used in powdered form.

Cholera has been present during the year in Brazil, China, Dutch India (Java and Batavia), Egypt, India, Japan, Philippine Islands, Straits Settlements, Syria and Turkey.

Yellow Fever.—The observations and literature of the year in connection with this disease confirm the belief in the part played in its dissemination by the mosquito *Stegomyia fasciata*, acting as an intermediate host for the yellow fever parasite.

In the early part of 1902 Dr. George E. Beyer, Professor of Biology in Tulane University, and Dr. O. T. Pothier, Pathologist to the New Orleans Charity Hospital, with Assistant Surgeon Herman B. Parker, were sent by the surgeon-general of the United States army as an expedition to study yellow fever, especially its etiology, in either Mexico, Central America, or South America. The expedition began work at Vera Cruz on May 12, 1902, and continued till near the end of October. Examinations of material brought from Mexico were prosecuted in the United States up to the date of the report, February 17, 1903. The report was issued in March, 1903. The conclusions reached are, we learn from an analysis of the report given in the *New York Medical Journal*, as follows: 1. Bacteriological examination of the blood of persons with yellow fever during life, as well as of the blood and organs immediately after death, in uncomplicated cases, is negative. 2. The mosquito known as *Stegomyia fasciata*, when allowed to suck the blood of a yellow fever patient after the lapse of forty-one hours and a half after the onset of the disease, and subsequently fed on sugar and water for twenty-two days and an hour and a half, can, if permitted to bite a non-immune person, produce a severe attack of the disease. 3. *Stegomyia fasciata* contaminated by sucking the blood of a yellow fever patient, and then killed, cut into sections, and appropriately stained, presents with regularity a protozoon parasite, *Myxococcidium stegomyiae*, that can be traced through a cycle of developments from the gamete to the sporozoite. 4. *Stegomyia fasciata* fed on the blood of a person with malarial fever, on normal blood, or artificially, does not harbour the myxococcidium.

As regards the question whether or not *Stegomyia fasciata* is the only means of transferring the disease, the report says: 'To prove a negative assertion, conditions must be supplied to produce the disease at will or under constant conditions. In the whole history of the disease such data, to this date, are wanting. When one instance occurs and can be repeated the new factor can then be taken into consideration.' The name *Myxococcidium stegomyiae* is given tentatively to the sporozoon, though its classification among the *Haemosporidia* is 'based entirely upon practical considerations of convenience rather than upon a conviction of its exact position,' since its schizogonic cycle has not yet been observed.

Though the subject of the conveyance of mosquitoes by ships was not studied in detail, owing to lack of facilities, some interesting observations were made. It was found that wooden water tanks were more likely than iron ones to be contaminated, owing to the fact of their being less carefully cleansed, also that the well of the car-

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penter's grindstone was a favourite place for the breeding of mosquitoes. Advice is given as to the screening of rooms in which yellow fever patients are placed.

Balfour calls attention to the fact that the bilge water of steamers is often swarming with a larvæ of mosquitoes, and that attention should be given to this fact. A ship-bred mosquito might very well pay a flying visit ashore and come back infected and spread the epidemic in its accustomed quarters.

Assistant Surgeon Grubbs, of the United States navy, in charge of the gulf quarantine station, has, we learn from the *Medical News*, issued a report of an investigation which he has made with the object of deciding to what extent and under what circumstances mosquitoes infected with yellow fever germs can be carried by vessels. From June to November, 1902, he inspected vessels arriving from ports where the presence of the *Stegomyia* render them liable to infection. Of the 82 vessels from possible yellow fever ports, 65 had no mosquitos on board at any time during the voyage, 5 had the insects on board at the port of departure, 9 reported the appearance *en route* of *Culex*, or harmless mosquitoes, and three brought *Stegomyia* to the station. All three of the last group were from Vera Cruz, a yellow fever port, and the voyages lasted on an average 17 days. Surgeon Grubbs formulates the conclusions to which his investigations have led him as follows: First, that mosquitoes can come aboard a vessel under favourable conditions, when the vessel is not over 15 miles from shore; secondly, that *Stegomyia* can be carried from Mexican or West Indian ports to those of the Gulf States; thirdly, that they can board a vessel lying at anchor half a mile or less from shore, being conveyed by the open lighters used or flying aboard; and, finally, that a vessel moored a short distance from land may become infected with yellow fever, old beliefs to the contrary notwithstanding.

This disease has been present this year in Brazil, Colombia, Costa Rica, Ecuador, Mexico, Nicaragua, Texas, and Venezuela.

In Havana there has not been a case of local origin for two years. Nine cases have been imported this summer, but having been so protected that they could not be bitten by mosquitoes, no other cases were occasioned by them.

In a report to Surgeon-General Wyman, of the United States Public Health and Marine Hospital Service, under date of the 23rd instant, Dr. Guiteras describes as follows the character and application of the disinfecting material, &c., used in screening houses in the suppression of the present epidemic of yellow fever in Laredo, Texas:

The term 'disinfecting material' includes everything utilized in the prevention of the spread of yellow fever, based upon a complete acceptance of the fact that the mosquito is the only means of transmitting the disease. It therefore includes disinfecting material, as usually understood, such as sulphur, pyrethrum, &c., and also lumber for screening purposes, mosquito and wire netting, oil, wooden faucets, &c.

The methods instituted are as follows: There are three screening and five disinfecting crews. When a suspicious or positive case of yellow fever is reported, a screening crew is at once sent to the house, with a cart containing the necessary material, and the patient is immediately screened—the carpenters putting in ready-made screen doors or windows, or, when these are not available, making them on the spot. Where screening is impossible or impracticable, the patient is placed under a mosquito bar. The disinfecting crew follows immediately after the screening crew and disinfects that part of the house not occupied by the patient. On the conclusion of this disinfection the patient, if able to be moved, is transferred to one of the disinfected rooms and his room disinfected.

All water containers in a house are covered with oil, and faucets inserted in the barrels of drinking water.

Sulphur and pyrethrum are used in disinfection, the former where there is no danger of injury to the contents of the room, the latter where such injury may be apprehended. Where pyrethrum is used care is taken to sweep the room, so as to collect all the mosquitoes that may have been simply stunned by the fumes of the powder.

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In the disinfection large quantities of paper strips are used in order to make the rooms air-tight. In some of the houses it is necessary to paper almost the entire building.

William Lyman Underwood, writing in the *Popular Science Monthly* with regard to the length of life of the mosquito, says that it is not known just how long mosquitoes can live, but their average life is much longer than ordinarily supposed. Thousands of them live through the winter, hibernating in dark places in barns or house cellars. In sparsely settled localities, where they cannot find such places for shelter, they live through the winter in hollow trees, in caves and holes under upturned trees. Even though the temperature may fall far below freezing, they are not winter killed, but on the approach of warm weather become active again. Mosquitoes are frequently seen flying about in the woods before the snow has wholly left the ground.

Smallpox.—This disease has prevailed extensively throughout the year, appearing in Argentina, Austria-Hungary, Barbados, Belgium, Brazil, British Guiana, Canary Islands, Chile, China, Colombia, Costa Rica, Cuba, Ecuador, Formosa, France, Germany, Gibraltar, Great Britain, Hawaiian Islands, Honduras, India, Italy, Jamaica, Japan, Korea, Malta, Mexico, Netherlands, Newfoundland, Philippine Islands, Porto Rico, Russia, Spain, Straits Settlements, Switzerland, Trinidad, Turkey, Uruguay, Venezuela, West Indies.

Smallpox continued in widespread form in the United States, some 26,937 cases having been reported for the first six months of this year, and some 10,419 from July 1 to this date.

This disease has continued therefore to threaten us throughout the year, on the Atlantic and Pacific seaboard, and from the neighbouring republic along our frontier. This has necessitated the maintenance from time to time at different places of inspectors and guards at those of your unorganized inland quarantines where the threatening has seemed the most serious. There have been also outbreaks of the disease in different parts of the North-west Territories.

Smallpox has been brought to some of your maritime quarantines also.

In each instance the disease was stamped out at the quarantine station.

Its continuance and spread seem still to be due, in part at least, to continued errors in not recognizing it, although it appears difficult indeed to understand how a diagnosis of chickenpox can everywhere be a sufficient explanation of a large number of cases of an infective eruptive disease occurring amongst other persons than small children, and causing occasional deaths.

In the spring of this year Prof. W. T. Councilman, of the Harvard Medical School, announced his discovery of the micro-organism that causes smallpox. Dr. Councilman stated that for two years the study has been carried on under his supervision by Drs. Brinckerhoff, McGrath, Tyzzer and Thompson in the laboratories of the smallpox hospital at Galloupes Island, and in the Detention Hospital on Southampton street, with the cordial co-operation of the Boston Board of Health.

All the material obtained was brought to the Harvard Medical School and thoroughly studied there. First vaccinia was studied and then the contents of the vesicles and pustules, but no definite germ could be here detected because of the vast number of bacteria of varying kinds always present. Finally an anatomic study of the lesions of the disease revealed the organism with its definite cycles of development. In the deep epithelial cells of the skin there were found bodies one micron in diameter, which have also been noted by other observers. They stain easily, are homogeneous, increase in size, their structure gradually becomes granular, their shape irregular, and they are surrounded by little circles more or less resembling amœbæ. Occasionally segmentation is evident, the organism splitting into a number of segments.

This is a distinct cycle. There is no change in the nuclei, a vacuole surrounds the organism and grows with it. Suddenly it disappears and peculiar changes are noted in the nuclei, a ring appears and grows, rings appear in its periphery and its structure

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becomes sponge-like. This finally fills the whole nucleus, which degenerates and sets free the body. It does not much further increase in size, but the structure becomes more complex, the ring-shaped bodies appear, one micron in diameter, and it breaks up into these 'spores.' We have thus, as in other protozoa, two cycles, the intracellular and the intranuclear, the latter more complex and corresponding to sexual development.

In vaccinia we have only the first cycle, and this is the case also when the rabbit is exposed to smallpox. The monkey being nearer to man, however, gives both cycles. The whole process is complete when the vesicles begin to form. These stages are not found in the vesicles, pustules or crusts, but the 'spores' have been found in the blood vessels of the skin. These are probably not the only cause of the later eruption, but prepare the way for the streptococci. Professor Councilman showed a beautiful series of lantern slides made from micro-photographs which fully and clearly substantiated each of his statements.

Professor Calkins, professor of zoology at Columbia University, was present and agreed with Professor Councilman in believing the organism a protozoan. He warmly congratulated Professor Councilman and his associates for their investigations and discoveries, and specially noted the advantages of the discoveries in aiding the early diagnosis of the disease. If the organism can be found in the epithelial cells or the blood instead of our having to wait fourteen days for the eruption to appear, valuable time would be saved and the possibilities as regards treatment are evident. The organism belongs to the class of microsporidia.

The Red-light treatment of Smallpox.—Professor Niles R. Finsen, Director of the Finsen Light Institute of Copenhagen, in an article in the *British Medical Journal* under date June 6 last, asks the question: 'Is the treatment of smallpox patients in broad daylight justifiable?' He says: 'Ten years have elapsed since I first advocated red light in the treatment of smallpox. During my investigations on the effect of various rays of light my attention was directed to some old reports, especially American and English, on the injurious influence of light in smallpox, which coincided with my own observations as to the effect of light upon the skin. Knowing full well, if this were so, that the injury was due to the chemical rays of light, I recommended that the patients be protected against these rays by placing them in red light, exactly in the same way that photographers protect their plates from the chemical rays. In the course of years this treatment was tried in many places, meeting everywhere with unquestionable success. At the present time about twenty physicians in various countries, mostly, however, in Scandinavia, have given this treatment a trial, and all of them have obtained most favourable results when the treatment has been properly conducted.'

'From numerous trials, together with various simultaneous controlling experiments, it may be considered as an irrefutable fact *that daylight and especially the chemical rays have a most injurious effect on the course of smallpox, as the suppuration of the vesicles is due to the effect of light*; and that, accordingly, it is possible to avoid the suppuration and its consequences by protecting the patients from the action of light. On the other hand, light seems to have no action on the smallpox infection itself, and death caused by the latter cannot be prevented by excluding the chemical rays. But even the avoidance of suppuration is in itself of the greatest importance, for it is a well known fact that the suppuration stage is the most dangerous of the various stages of smallpox. Moreover, it may be stated that the greatest number of deaths are due to suppuration, which, *ceteris paribus*, would be prevented if no suppuration were present. Further, the numerous complications and sequelæ due to suppuration may be avoided, as well as the disfiguring pitting, which is no small consideration. Smallpox is one of the most terrible diseases known, but the appalling feature which makes it so much dreaded is mainly due to the suppuration and its con-

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sequent sequelæ. When after the teaching we have received one hears for the first time that suppuration is due to light, especially to the blue, violet, and ultra-violet rays, and may with certainty be avoided if these rays are kept off, one is naturally somewhat sceptical. When it is demonstrated, however, that this observation rests on a *fact established by practical experience, which fully agrees with scientific theoretical investigations*, this scepticism must gradually give way to what is both rational and scientific.

‘The action of light on the course of smallpox is astonishing, and the effect of the red-light treatment is one of the most striking results known in medicine. Even in cases of confluent smallpox or in unvaccinated persons the method very rarely fails, supposing, of course, that the patient comes under treatment early enough. If suppuration has begun or is on the point of beginning the red-light treatment will not stop it.

‘After all, what we are dealing with here is not, properly speaking, medical *treatment*; it is more a preventive measure against the injurious effect of light. In the case of a disease where it is open to the patient to choose his doctor it may be said that he has himself to blame if he chooses a physician who does not know how to protect him from the dangers that threaten him. But when the disease *in question is one in which the public health authorities oblige the patient to go into a particular hospital, he has a right to ask that he shall not there be unnecessarily exposed to dangers that may be fatal or at least are liable to disfigure him for life.*

‘It seems to me expedient to present the subject from this standpoint. From the foregoing I believe that the question put as the title of this paper must be answered peremptorily in the negative. Furthermore, from a modern scientific point of view, *it must be considered absolutely unwarrantable on the part of the public health authorities to treat serious cases of smallpox, in which suppuration might be expected, in hospitals where patients are exposed to daylight.* As to the private physician it must be considered *a gross shortcoming if, as soon as he diagnoses smallpox, he does not make preparations to prevent the patient from being exposed to daylight.* It is a most simple measure, which may be carried out everywhere, for everywhere it is possible to darken the windows, hanging up something before them. A candle will supply all the necessary light. The incompetency shown by the physician who allows the patient to lie in daylight is no less stupendous than if he neglected the ordinary aseptic measures in performing a capital operation.’

On the other hand, Jay F. Schamberg (*Journ. Amer. Med. Assoc.*, May 2, 1903) examines the claims made on behalf of the red-light treatment of smallpox. After a critical summary of the literature (Finsen, Lindholm and Svendsen, Feilberg, Stranggaard, Benckert, Mygind, Abel and others) he states that during the winter of 1902 William M. Welch, physician in charge of the Philadelphia Municipal Hospital for Contagious and Infectious Diseases, and himself fitted up a room for the red-light treatment of smallpox. Although their experience was limited to two cases, the results were such as to destroy any confidence in the method they might have possessed. Their red room was complete in its appointments. The window panes were of a ruby-red colour, the gas-jet at night was surrounded by a red globe, the walls of the room were painted deep red, and a red curtain covered the inner of the two doors so as to completely exclude the light of day. Two unvaccinated young men (one 16 years of age and the other 20), who started with profuse eruptions, were placed in this room about the third day of the eruption, before the lesions had become frankly vesicular. The course which the disease pursued in both cases was in no wise different from that seen in patients treated in the regular wards. The pustules filled up and became confluent, the secondary fever was high and protracted, and the patients markedly delirious. One of the young men, who was a private case, and had a special nurse day and night with every possible attention, succumbed to the disease. The other recovered, but with most disfiguring scars. Owing to the discouraging results obtained

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in these two cases this method of treatment was abandoned. Schamberg goes on to say that it might be urged with apparent justice that an experience with two cases should not be counted as an offset to the results of treatment in 150 cases. He points out, however, that it must be remembered that the method failed absolutely to exercise any modifying influence on the disease in these two cases under appropriate conditions. Of the 150 cases, nearly all of which did well, other factors might account for the good result. Practitioners differed as to what constituted severity in smallpox. Several photographs of patients treated with red light, who recovered with no scarring or only insignificant scars, published in Finsen's book, represented what in the United States would be regarded as mild and favourable cases, the eruption being on the skin rather than in it. It must, says Schamberg, be remembered that Denmark, Sweden, and Norway are, with the exception of Germany, the best vaccinated countries of Europe. It is illogical and misleading to attribute favourable results to certain measures employed in the treatment of smallpox in persons once vaccinated. The vast majority of such patients recover without scarring under any treatment and even without any treatment. Again, in the absence of severe epidemics—and there have been no severe epidemics in the past decade—young children with variola (who are, of course, unvaccinated) usually escape without permanent scarring. The character of the prevailing form of smallpox, whether mild or severe, is a matter of great importance in determining both mortality and disfigurement. During the year ending June 30, 1902, there were in the United States 55,857 cases of smallpox with 1,852 deaths (a mortality rate of 3·31 per cent), and in the year previous 38,506 cases and 689 deaths (a mortality rate of 1·79 per cent). What would the verdict have been if red light had been used in these cases?

It is possible that the failure thus noted by Schamberg in his two trial cases may have been due to the nature of his glass of a ruby-red colour. It is well known to photographers that some red glasses fail to quite prevent the passage of the actinic rays. Vogel, of Berlin, in his *Practical Pocket-Book of Photography*, says: 'The selection of the ruby glass is very important. What is called red copper-glass is employed; red gold-glass is useless. A good ruby screen will only transmit red light, and can be tested in this by a spectroscopic examination. Unfortunately, most screens do not satisfy these conditions, but allow a considerable amount of blue and green light to pass as well as red. If you have no spectroscope you can satisfy yourself whether it transmits pernicious light by exposing a dry plate, half covered with black paper, at the distance of half a yard for half a minute, and then develop it. If pernicious light has been transmitted, the exposed end darkens in the developer.' And Abney, in his work on *Photography*, says: 'Ruby glass alone is not a sufficient protection, since blue light is apt to permeate it. The safest plan, perhaps, is to glaze the window with stained red glass, and then to have a curtain over it of an orange colour.'

Chloroform in the preparation of Vaccine.—Dr. Alan Greene, in a report to the Local Government Board, published this year, on the germicidal action of various substances on the micro-organisms, specific and extraneous, of vaccine lymph, affords strong presumption that we are likely to obtain in chloroform, as applied by the methods devised by him, an agency not only more potent but infinitely more speedy than glycerine in eliminating from our vaccine lymph undesirable micro-organisms.

An account of the first experiments made by him on this subject appeared in a paper published in the report of the medical officer to the Local Government Board, 1900-1901. The present paper deals with the continuation of those experiments.

'The object throughout has been to ascertain, as far as possible, the relative resistances of the specific and the extraneous micro-organisms contained in freshly collected vaccine to various chemical substances, and to compare such resistances with the resistance of similar germs to glycerine.

'As mentioned in my former paper, the results of the action of glycerine on vaccine material are fairly well defined. Generally speaking, its action is germicidal

to the non-sporing adventitious bacteria of crude vaccine in from 4—8 weeks, the specific organism remaining meanwhile resistant to this destructive action, and continuing potent for considerable periods of time. As in the case of the specific organism, spore-bearing organisms also show considerable powers of resistance. These spore-bearing organisms, which occur occasionally in vaccine, are practically confined to the mesenteric group of bacteria. Indeed, in the thousands of vaccines examined at these laboratories no other variety of spore-bearing bacteria has been found.

‘While much investigation has been made of the action of glycerine on vaccine, apparently little is known concerning the action on vaccine of other chemical substances, and glycerine appears to be, at the present time, the only agent in vogue for the “purification” of vaccine. That this property was not peculiar to glycerine, but was possessed by other substances, was shown last year in the paper already referred to.’

Owing to the rapid manner in which, in the first experiments in 1900 and 1901, chloroform in saturated watery solution was found to kill the extraneous organisms of vaccine, while the specific germ of vaccine retained its potency apparently unimpaired, further experiments have been made during the past year of mixing vaccines with this substance. They consist of four series of experiments.

So far the following points have been demonstrated:—

1. Pure chloroform, whether used alone, in excess in chloroform water, or in excess in a 50 per cent solution of chloroform water and glycerine, is rapidly destructive to the extraneous bacteria of vaccine, with the exception of the spore-bearing organism *bacillus mesentericus*, and rapidly causes the potency of the specific germ to be destroyed.

2. Chloroform water, or a solution of 50 per cent glycerine and chloroform water, is destructive to the extraneous bacteria of vaccine, with the exception of *bacillus mesentericus*, in about six hours, while it has left the vaccine specific germ potent for as long as eight months. In the control vaccine, prepared with a 50 per cent solution of glycerine and water, elimination of extraneous bacteria rarely took less than, and was not often not complete in, seven weeks. Here also *bacillus mesentericus* proved resistant to the germicidal influence. In no case did a control vaccine give rise to better vesicles than the vesicles originating from an experimental vaccine.

Other points have been touched on in these experiments, but further work is needed in order to draw definite conclusions with regard to them. One of these points is the desirability of using or omitting glycerine in the preparation of chloroform vaccine. So far, although several such vaccines have been mixed, with and without the presence of glycerine, it has not been practicable to do more than draw conclusions as to the relative germicidal values of the two methods, and these values are apparently equal. Where glycerine has been used in addition to chloroform water the advantages have been solely due to the increased viscosity and specific gravity of the mixed vaccines, which have thus been easier of manipulation; that is to say, the uses of glycerine so far in this connection have been strictly those of an ‘emulsifying’ medium, and the uses of chloroform have been strictly those of a very rapidly acting ‘selective’ germicide. Further experiments are needed to determine the relative keeping properties of chloroform vaccine, with or without the presence of glycerine. So far, all that is definitely known is that both these kinds of vaccine will retain their potency for several months. It would seem probable from analogy that vaccine mixed with any germicidal substance must suffer in some degree loss of potency; and possibly it will be found that combination of chloroform water and glycerine may prove more detrimental to prolonged activity than the action of chloroform water alone continued for only such time as is necessary for the elimination of the extraneous micro-organisms.

And he adds: ‘Quite lately I have devised another method of treating vaccines with chloroform which so far has given very satisfactory results. Roughly, this

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method consists of passing a mixture of *chloroform vapour* and air through vaccines previously mixed either with distilled water or with distilled water and glycerine solution. In this way elimination of extraneous micro-organisms is found to be as complete, and in point of time more rapid, than by former chloroform methods, while the specific germ remains fully active.'

The potency of some vaccines, glycerinated or otherwise, becomes greatly impaired within a few weeks of collection—that is, within the time required for glycerine to exert fully its influence in eliminating extraneous organisms. Some of these vaccines may, at the time of their collection, have possessed a high vaccination value. Vaccine, characterized by this high but somewhat transient potency, can by means of the chloroform process be used at once before its activity has deteriorated, thus allowing greater economy of vaccine material than would otherwise be possible. For a similar reason the chloroform process might be of considerable use in hot climates, where the preservation of the potency of vaccine is frequently a matter of considerable difficulty.

Glycerine in the preparation of Vaccine.—Dr. Rosenau, Director of the Hygienic Laboratory of the United States Public Health and Marine Hospital Service, in a bulletin dated last month, writes as follows:—

'This study was undertaken and is published on account of its importance from a public health standpoint, particularly in view of the fact that glycerine is used to conserve vaccine virus and analogous products. On account of its bland and non-poisonous properties glycerine has long been used as a preservative for organic matter; but not until 1891, when Copeman claimed for it special virtues as a germicide, did it come into general use to purify vaccine virus.

'A false sense of security arose over the overestimate of the antiseptic and germicidal value of glycerine. This fact we have brought out in previous publications on the subject of the bacteriological impurities of vaccine virus. Other substances, such as chloroform vapour, chloretone, potassium cyanide, carbolic acid, formalin, &c., have since been used as a substitute for glycerine with more or less success, and it is possible that one of these more energetic germicidal substances may be found to be superior to glycerine for this particular purpose in commercial practice.

'In brief, it may be stated that glycerine has distinct but very feeble germicidal and antiseptic properties. The results are summarized as follows:—

'Small quantities of glycerine, less than 10 per cent, added to nutrient media have well known powers of favouring the growth and multiplication of many forms of bacteria.

'The presence of 50 per cent of glycerine will restrain all bacterial growth. Less than this amount can not be depended upon for the preservation of vaccines and other organic growths.

'The antiseptic power varies for the different glycerines. For instance, some restrain all growth and development when present in the proportion of 43 per cent; others require 49 per cent.

'No evident growth or multiplication of bacteria takes place in nutrient media containing 32 per cent of glycerine, but moulds grow in stronger percentages, viz., 40 to 49 per cent.

'In order to prevent the growth and development of pus cocci at least 33 per cent of glycerine must be present. This is more than that required to restrain the growth and multiplication of the other eighteen different pathogenic and saprophytic bacteria tested.'

Trinidad was visited by an epidemic eruptive disease last winter and spring. Dr. R. Scheult, the health officer of Port of Spain, wrote to me in March and April last, detailing the symptoms and inclosing photographs. From his letters I had no

hesitation, in answer to his request, in saying that in my opinion the disease was smallpox. It is, however, of that same mild type which has prevailed in the United States and Canada for the last few years, and which I have described under the suggested title of *Variola Ambulans*. Photographs of actual cases in Trinidad, and of some in the North-west Territories of this country, suffice to show the strong resemblance.

Leprosy.—Dr. Jonathan T. McDonald, pathologist to the Hawaiian Territorial Board of Health, gives the following as a brief summary of a diagnostic examination of one hundred and fifty cases of leprosy:—

1. The microscope is the supreme agent of the final diagnosis of leprosy. No patient should be committed to a segregated colony without a bacteriologic demonstration of the disease.

2. Of clinical symptoms, maculæ, chiefly leucodermic spots are found in 89 per cent of all cases.

3. The lepra nodule found in 74 per cent is the one chief distinguishing lesion of skin leprosy.

4. Thinning or complete loss of eyebrows and lashes is present in 63 per cent.

5. Atrophic changes in hands and forearms with retraction and contraction of fingers and enlarged ulnar nerve in 32 per cent a leading feature of nerve leprosy.

6. The planter ulcer found in 26 per cent, usually on the ball of the foot.

7. Absorption of phalanges in 16 per cent, with occasional spontaneous amputation.

8. Elephantiasis of hands and feet in 16 per cent.

9. Facial paralysis in 11 per cent.

10. The entire body should be carefully tested for anæsthetic areas.

11. Several of the above symptoms can be found in some slight degree at least in every leprous subject.

Jonathan Hutchinson, F.R.S., has returned to England after a tour of investigation in India as to the cause and prevention of leprosy, especially in reference to the hypothesis which assigns the foremost position among the causes of the disease to the use of unwholesome food.

Twelve years ago the Prince of Wales' committee, which was sent to India, rejected this hypothesis, but Dr. Hutchinson's latest investigations have convinced him that the committee, if it had pursued its researches more deeply, would not have rejected it. Dr. Hutchinson's general conclusion is that the facts do not controvert the hypothesis, while some of them afford unassailable support of it, of the truth of which his inquiries in South Africa last year convinced him.

Dr. Hutchinson's tour of India included visits to Colombo, Madras, Lahore, Calcutta and Bombay, where he held public meetings and discussions, and also visits to the leper asylums at Colombo, Madras, Calcutta, Purula, Asonsal, Agra, Tarntaran, Jullundur and Bombay.

He visited in Ceylon all the lepers who had been fish eaters. In Madras and Calcutta each of the lepers, with the single exception of a high-class Brahmin, denied that they had ever eaten fish. In Bombay there was one doubtful exception. In Agra, Tarntaran and Jullundur there were several exceptions. Of the 500 inmates of the Purula asylum, all had habitually eaten of fish, and many believed that this had caused the disease. Some had left off eating it on that account. The majority of those who had not eaten fish were patients who had contracted the disease in early life.

In accounting for these, Dr. Hutchinson suggests 'commensal communication' spreads the disease to a slight extent in a community where it has once originated, without it becoming contagious in the ordinary sense of the word. Commensal, or mouth communication, conveyed the disease by eating food directly from the hands of a leper, or otherwise received the bacillus by the mouth.

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The prevalence of the disease in the whole population of India is not greater than 5 in 10,000, which is about the same percentage as in Norway, but not a single district is entirely free from the disease. It is always more prevalent in or near the fishing places. In Ceylon, where the fisheries are so unproductive that the greater portion of the fish consumed must be imported, the incidence of leprosy is less than two per 10,000. In Minicoy, the adjacent fish-exporting island, where the inhabitants eat fish four times a day, the percentage is 150 in 10,000. In the Bombay asylum there are 400 inmates, the majority of whom are from the great fishing district of Konkan. During eight years there have been no Jains, and only one Parsee patient. The Jains are strict vegetarians.

Mr. Hutchinson said that he was much struck in the report of an asylum near Bombay concerning a column in the report headed Salsette Christians. The number of lepers under that heading was more than under the heading of Hindus or Mohammedans. Salsette Christians simply meant Roman Catholic Christians living in the island of Salsette. The patients from the Salsette Christians in the asylum were very much out of proportion to their ratio to the population. If it were supposed that Jain and Hindu, and Mussulman and native Christian were all equally exposed to the risk of leprosy, the Hindus ought to have furnished 1,419 patients to that asylum, but they really furnished 365; the Mussulmans ought to have furnished 372, they really did furnish 45; the Christians ought to have furnished 9, they furnished 60. Similar tables from other asylums showed the same sort of thing. The Salsette Christians were fishermen, and Mr. Hutchinson considered that there was no other conclusion than that the change to Christian food by the poorer classes of India, and most especially to that enjoined by Roman Catholicism, was most powerfully productive of leprosy. Amongst the facts as to leprosy which were generally acknowledged might be noted: Its world-wide distribution; its great antiquity; its marked preference for certain localities; its sameness in all regions and in all races; its very scattered and scanty occurrence in many large districts which yet never became free from it; the absence of any evidence of contagion in connection with leper asylums; the assertion by a large majority of the patients that they had never knowingly been exposed to any risk of contagion; it was remarkably persistent in certain localities; the proof of it being transmitted hereditarily was for the most part negative; in no region where it had been long established did it ever in any locality assume epidemic prevalence; it was prone to die out and leave large communities amongst whom it had been prevalent entirely free; in all declared cases it had a bacillus which resembled closely that of tuberculosis; experiments in inoculation had always failed; no primary sore or patch was ever identified on the surface; it might have almost indefinite periods of latency or incubation; in almost all countries and in all ages in which leprosy had prevailed there had been more or less a popular belief that it had been caused by fish eating; when two communities living in close proximity, the one addicted to hunting, the other to fishing, it was the latter that might suffer severely and the former that might wholly escape; and it had been wholly or almost wholly absent from Cape Colony, from Natal, from the Sandwich Islands, and from some other places until factories for the salting of fish were instituted.

Mr. Hutchinson, contrary to general expectation, as a result of his visit to India, has not only retained his long-held beliefs concerning fish and leprosy, but actually seems to have strengthened them. He strongly asserts that the consumption of putrid or tainted fish is the cause of the leprosy which exists in India, and he has appealed to the government to take the tax off salt, so that the natives may be able to cure the fish which they wish to use as food.

Dr. T. J. Tonkin, medical officer of the Hansa Association's Central Soudan Expedition, writes in the August and September numbers of the *Empire Review* of his experience among the lepers in that part of the Soudan known as Northern Nigeria. Leprosy is extremely prevalent there—more so, perhaps, than in any other locality of

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a like size in the world—so that the writer who spent a considerable time among the Nigerian lepers, is able to give valuable information as to their habits and mode of life, and his views with regard to the disease are worthy of close attention.

His opinions respecting the contagiousness of leprosy are in accord with those of Hansen and many other prominent authorities, but he combats the popular notion that the disease is incurable. With respect to this point he says: 'Leprosy is supposed to be incurable. Incurable it certainly is, in the sense that at present we are not in possession of any remedy that affects its course as definitely as, say quinine affects that of malarial fever, and iodide of potassium another more common than reputable disorder. It is not incurable in any other sense, however. Recoveries from the disease are by no means of infrequent occurrence. As a matter of fact, it is a rare thing to hear of the actual morbid processes covering a period of more than twenty years. If the patient has survived so long it will often be found that all specific leprosy manifestations have disappeared.

The influence of heredity on the spread of leprosy, Dr. Tonkin thinks, is another popular fallacy. He states that, in point of fact, direct heredity has nothing whatever to do with the spread of leprosy, and that his Nigerian results bear directly on this point. Of all the lepers examined by him in the Soudan, only 10 per cent had any leprosy taint in their ancestry, leaving 90 per cent that must have derived their disease or their tendencies from other sources. Moreover, among the children of leper parents, a percentage of less than ten developed the disorder.

The writer regards defective diet as playing an important part in the development of leprosy. But he holds that leprosy is a contagious and infectious disease, and in the Soudan is spread from person to person mainly by the agency of infected clothes. He maintains that segregation is an effectual means of checking the advance of the disease and of finally stamping it out. This method is, unfortunately, impracticable in the Soudan, China or India, but much the same cycle of changes may be anticipated in these countries as took place in England and in other lands where leprosy was once rife, but where it is now extinct. As civilization progresses and as the countries in which leprosy is now prevalent come under the sway of western nations, sanitary methods and a higher manner of living will, in Dr. Tonkin's opinion, drive out the disease.

Dr. Isidore Dyer, Professor on Diseases of the Skin, New Orleans Polyclinic, and Consulting Leprologist to the Louisiana Leper Home, writes as follows, as to the communicability of leprosy, in a paper read at the session this year of the section on hygiene of the American Medical Association:—

'Notwithstanding the fact that the lepra bacillus is found in all cases of leprosy in which there are evident lesions of the disease, that the bacillus is frequently in the nasal secretions, that it has been found in the earth from the graves of lepers, that it has been found in the rooms where lepers lived, that it has been found on utensils used by them, there are those who contend that the disease is not contagious. Their argument is based on the fact that Koch's law is not fulfilled, i.e., that the disease is not propagated in animals nor in other subjects, who, inoculated in turn, transfer it to others. I believe we can dismiss these antagonists because of their purely technical position in the face of other circumstantial and positive evidences. To wit: Leprosy spreads in any community in which it is introduced; it spares neither old nor young; it may be selective of race, but it occurs almost directly in close community life; it occurs in families, and has not been proven hereditary; it frequently attacks the children before the parents; there is almost always a history of exposure, either direct or indirect, and, if sought for, communication of the disease from person to person may be traced.

'Opinion to-day classifies the degree of contagiousness in leprosy. Formerly it was believed that contact with the unbroken skin of a leper would produce the disease. Popular fear created the impression that looking at a leper, being in his

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presence, was sufficient; to-day, the consensus of opinion carries the belief that the nasal and buccal secretions, together with those of the generative apparatus, are the most frequent sources of the spread of the disease. This is borne out by the fact that the tubercular types of leprosy nearly always show the first signs on the exposed parts of the body, face and hands, and that early in the disease the nasopharynx presents tubercles.'

He gives a historical summary of the spread of the disease, and has the following to offer concerning its prevention: First, as to the individual, either the patient should be segregated with those of like condition, or else, if he lives in his own family, he should be given a separate room; should have his meals alone; should wash his own utensils and should have his laundry boiled separately. The author believes that this is difficult, because, even when the family are aware of the disease they become careless in the family relations. Second, as to the public. The proper public care of lepers provides (a) segregation under systematic methods which should consider (1) the segregation of the sexes; (2) some arrangement by which the trophic or nerve type should be entirely separate from the tubercle type or skin leprosy, because there is no reason why a leper with nerve leprosy should not acquire fresh lesions from infection by a new contagium carrying the leper bacilli, found so freely in the tubercle type. Heretofore leprosy has been held as incurable, and the simple diagnosis of leprosy has been sufficient to condemn a victim, irrespective of the type, and he is doubly condemned if he is exposed to fresh infection while he is trying to get well. (b) Particular methods of sanitation should obtain. No institution pretending to care for lepers should be without the fullest equipment for bathing facilities, both medical and plain. Water in leprosy is as potent in its prophylaxis as it is for remedial use.

In connection with Hutchinson's belief that leprosy may be due to the eating of badly cured or tainted fish, it is of interest to note that Dr. Smith reports that he has been informed by some of the older people of Tracadie that in former days, and even as recently as thirty years ago, the inhabitants living along those shores, would not eat fresh or well-cured fish, but laid it aside until tainted. 'They wished to have some taste to it.'

Beri-beri.—Dr. Ashmead, late foreign medical director, Tokio Hospital, Japan, writes as follows to the *New York Herald* under date of August 27 last, concerning the etiology of this disease:—

'I beg to observe, relative to your news item in the *Herald* referring to the arrival of the barque *Wilkstrom, Jr.*, at Port of Spain, Trinidad, from the Brahmapootra, near Bengal, whose inhabitants are nearly all meat eaters, Mohammedans, with her crew dead or dying from beri-beri, and with a cargo of 16,000 bags of rice, that the cargo might have become wet and fermented enough to generate carbonic acid gases.

'I have investigated a great number of outbreaks of beri-beri which occurred on ships arriving at this port, and in every one of them I found there had been such generation—ships loaded with raw, low grade sugars from the East and West Indies and Brazil; with coffee, picked too green in Java, which had charred in the voyage; graphite (pure carbon), mined in Colombo, Ceylon; green hemp, from Iloilo, and last, a cargo of phosphatic earth, with seventy-five negro passengers, from Navassa Island, West Indies, who had been crowded and hatched down in a small cabin for thirteen days and nights without ventilation, and with four lamps burning from the confined area what little oxygen was at their disposal.

Besides this almost conclusive evidence that beri-beri is due to carbonic acid gases, and not to insufficient alimentation (the red corpuscles of the blood are never deficient in beri-beri), nor to germs contained in white rice of Saigon or anywhere else (I found beri-beri outbreak on a ship where beans and no rice at all were eaten during the entire voyage), there is the further fact that I found carbon in the blood of beri-beri which I analyzed. The hæmoglobin deficiency of beri-beri is in exact ratio with the

artificial poisoning by carbon, it being converted by the chemical into methemoglobin.

The Sei-y-Kwai Medical Journal, of Tokio, Japan, will soon publish an article of mine relative to analysis of beri-beri blood to find carbon. Moreover, Professor Miura, of Japan, found a case of beri-beri in a scientist who was shut up in December on the top of Mount Fuji with the crevices of his hut sealed to keep out the cold north winds.

‘Fujiyama is 12,600 feet high. This scientist had relied on the charcoal stove of Japan to keep himself from freezing to death. As it was, his fingers and toes were badly frozen. Now, if beri-beri was due to a germ in rice diet on the top of Mount Fuji in the month of December in Japan why does not beri-beri occur in the same month at sea level in Japan? It never does, for as soon as the southwest monsoons stop blowing and the cool north winds come in all beri-beri disappears. There is no beri-beri in winter time in Japan. It only occurs during the rainy season, June, July and August, when the air is so wet that water can be wrung from your clothing and everything is covered with green mould.

‘To solve the question of etiology of beri-beri a cause must be found which will apply to every beri-beri centre. The rice alimentary theory does not, nor does the rice germ theory, for I found beri-beri on American whaling ships in a crew where the diet was not rice, nor had the ship or crew ever touched at a beri-beri port.’

Dr. Ellis, Medical Superintendent of the Government Asylum, Singapore, is not a believer in rice as a causative factor in this disease. He writes to the *British Medical Journal* as follows:—

‘In this asylum beri-beri has been endemic since shortly after its opening in 1887, the deaths from the disease averaging 45 per annum, and the number of cases treated about 150 per annum for the five years ending 1900 out of an average daily number of 207. Since that date the disease has been nearly stamped out. Our numbers having considerably fallen, it has been possible to move the patients at every few days’ interval from one part of the asylum to another, thoroughly cleaning and disinfecting up behind as we move; more attention has been paid to the disinfection of clothes, bedding, furniture, single rooms, &c., and the ventilation and drainage have been recently improved. Above all, three years ago, two small wards were constructed on the sea beach four miles from town, and here all cases have been sent upon showing the slightest symptoms of beri-beri. These wards are washed out, walls included, in sea water, and then in a solution of mercury perchloride weekly. All woodwork is frequently whitewashed or tarred. The bed boards are soaked in sea water and dried in the sun twice a week. All clothing, bedding included, is changed and disinfected twice a week. The whole compound, consisting of sand, is raked over weekly, and thus thoroughly exposed to the rays of the sun, and from time to time the surface sand is collected and put on the beach below high water mark for a tide and then returned. All patients are bathed for at least half an hour daily, and are kept in the open during the whole day. Massage is used in all cases. The administration of strychnine, digitalis, iron, and very free purgation is the common medical treatment. To these precautions our present immunity from the disease—12 cases to date for the year and but 5 deaths in the last two years—is, in my opinion, due. One of these 5 deaths occurred in the seaside hospital, the other 4 patients were too maniacal to be sent there for treatment. Our patients, I may add, are all fed on Siamese rice.

‘Thirteen years ago I separated twenty healthy native patients on admission in two cottage blocks, giving them European food and no rice whatever. At that time beri-beri was very prevalent among the natives—we have never had any cases in Europeans or Eurasians—and I wondered if in any way the food was in fault. My experiment had to be given up in less than three months, as more than half of the twenty cases had by then developed symptoms of the disease. The opinion I then came to was that beri-beri was a place disease, that the soil and buildings were in-

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fects, and that people dwelling there were liable to absorb the poison, whatever it was, that this poison absorbed in sufficient quantities was the cause of beri-beri, and this opinion I have never seen reason to change. From that date disinfection has lately been relied on to combat the disease, and I can only regret that the more thorough manner in which we now try to carry it out was not adopted earlier.

'An instructive instance of a small epidemic of beri-beri on shipboard came under my notice in 1900, entirely, I think, putting Siam rice out of the question as a cause of beri-beri. A well-found steamer carrying 28 Malay and 51 Chinese hands, sailed from Singapore for New Zealand and Australian ports. All were fed on Siam rice, cooked in the same manner and in one galley. When in cold weather near New Zealand, beri-beri broke out in the starboard fore-castle inhabited by 14 of the Malays, and in all there were 8 cases and 5 deaths. This fore-castle had the galley situated immediately aft, with but a thin wooden partition between. The heat from the galley caused the cabin to be always sweating and steamy, as it was somewhat wet from the bad weather experienced at the time; in fact converted it into a perfect incubation chamber. Such a condition has been noted many times as favourable to the spread of the disease. No food was taken to or consumed in the fore-castle.

'I was consulted by wire as to any precautionary steps that could be taken, and recommended the erection of shelters on deck to accommodate the hands occupying the fore-castle, the thorough disinfection of the ship, paying special attention to the starboard fore-castle, which should not be used for habitation during the remainder of the voyage, and some ordinary medicinal treatment. On the ship's arrival at Melbourne the 3 sick were sent to hospital, where they recovered; 5 had died, and no further case had occurred, nor did one. Had the rice been in fault it is difficult to understand why the 8 cases occurring should have all been among 14 men occupying one cabin, and that the remaining 65 hands should have entirely escaped.'

Immunization to the Bacillus Typhosus.—The *Medical Record* thus states the present position of this question:—

'The efforts which have been put forth of late to produce a reliable anti-typhoid serum cannot be said to have been crowned with success. There is no agreement as to the efficacy of Professor Wright's method of anti-typhoid inoculation, although the weight of evidence would appear to warrant the belief that this mode of protection against an attack of typhoid fever is not to be depended upon. With regard to the surpassing importance of discovering some prophylactic agent which would prevent—if only to a limited extent—the prevalence of this disease, there is no need to insist. In time of war the death rate would be immensely decreased if it were not for the occurrence of typhoid fever. In almost every war which has taken place within the past fifty years this malady has been the cause of the greatest mortality.

Dr. W. Vernon Shaw, Wellcome Physiological Research Laboratories, writing in the *Lancet*, October 3, points out that in the case of typhoid fever it is especially difficult to produce an effective anti-serum, for the reasons that the organism is attacked as a whole, though the brunt of the attack falls on the tissues first invaded—i.e., the lymph follicles of the intestine, and further the reactions of the organism invaded by the bacillus typhosus are not well defined.

'Another practical difficulty in the production of active immunity to the typhoid bacillus is the separation or production of a soluble toxin. Rowland and MacFayden claim to have proved the presence of intercellular toxins in the bacillus typhosus. Their method was to grind up agar cultures of the bacillus, and so obtain a soluble toxin. With this view Professor Welsh agrees. Mallory goes further, and is of the opinion that the proliferation of the lymphoid tissues of the intestine, the mesenteric glands, and the spleen pulp is caused by the specific action of the typhoid toxin. Welsh—according to Dr. Shaw—is in accord with this idea, and thinks that the proliferation of these cells is partly compensatory and partly defensive.

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‘Dr. Shaw’s experiments were undertaken to show: (1) the virulence of the particular bacillus used; (2) the effect of normal horse plasma on bouillon cultures; (3) the immunization of a horse to the bacillus typhosus; (4) the value of the serum from such a horse; (5) the bactericidal power of normal blood compared with that from an immunized horse on the bacillus typhosus.

‘The conclusions reached as the result of these experiments were as follows: (1) The best method of obtaining a toxin is by the digestion of the bacilli. (2) This product is toxic. (3) This product can excite a reaction in susceptible animals, during which they develop immunity to the injection of living typhoid bacilli, and the serum from such an animal can protect another animal against typhoid infection. (4) The injection intravenously of living typhoid bacilli may result in the production of a “negative” phase of resistance.’

Tuberculosis.—The observations and experiments during the year all tend to confirm the belief that the human tubercle bacillus and that of the domestic animals are identical, but modified somewhat by their environment. Amongst others whose experiments this year support this view may be mentioned Hamilton and Young of Aberdeen, Gratia of Cureghem, Von Behring, McFadyen, Ravenel, Salmon, Kober and Kossel.

Hamilton and Young submit the following conclusions:—

We hold that our experiments prove—

1. That, although human tubercle is probably not so virulent for the calf as that derived from bovines, yet it can be readily inoculated upon that animal.

2. That this holds good whether the tubercle inoculated be derived from tubercular lymph-glands, tubercular lung, tubercular sputum or tubercular urine.

3. That it produces this positive result irrespective of whether it be introduced by feeding the animal with the tubercular material, by subcutaneous inoculation upon a peripheral part, by respiring a spray containing the bacillus, or by injection into the venous system.

4. That the organs most affected are those in immediate connection with the part operated upon.

5. That the lymphatic system is constantly involved in the resulting tuberculosis.

6. That when administered by the mouth, tubercular sputum induces an abdominal lymph gland tuberculosis without necessarily the intestine being any way involved.

7. That when tuberculosis from a human source has been ingrafted upon a calf, it gains enormously in virulence by being reinoculated upon a second calf.

8. That the morphological characters of the bacillus may vary according to circumstances, and are no guide to the source of the organism under observation.

9. That the above facts go to favour the view that the human bacillus and that of bovines are identical, but modified somewhat by their environment.

10. That our results are a direct contradiction of those alleged to have been obtained by Koch and Schütz.

Salmon, in an address on bovine and human tuberculosis, says:—

‘In the Bureau of Animal History two distinct lines of experiments have been carried on, in order that one might be checked up against the other. De Schweinitz, in the Biochemic division, has isolated nine cultures from human tuberculosis. Two of these were derived from human sputum, three from cases of generalized tuberculosis in adults, and four from cases of generalized tuberculosis in children. These cultures were compared with a newly isolated virulent culture of bovine tuberculosis, and among them two of the cultures from children were found to be identical in their cultural and morphological characters with the bovine bacillus. They also killed rabbits and guinea pigs in as short a time as did the bovine bacillus. Hogs inoculated subcutaneously with these two cultures from children died of generalized

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tuberculosis. Two calves, weighing over 300 pounds each, developed a generalized tuberculosis after a subcutaneous inoculation with these virulent human cultures, and a yearling heifer inoculated with one of them showed generalized tuberculosis when killed three months after inoculation. Both the cattle and the hogs had been tested with tuberculin and found to be free from tuberculosis before the inoculations were made. It will be observed that 50 per cent of the cultures obtained from children were virulent for cattle.

‘Mohler, working in the Pathological division, has obtained three very virulent tubercle bacilli from the human subject. A goat inoculated subcutaneously with a culture of one of these died in 37 days with miliary tuberculosis of the lungs involving the axillary and prescapular glands. This bacillus was obtained from the mesenteric gland of a boy. Of still greater interest is a bacillus isolated by Mohler from human sputum. A goat inoculated subcutaneously with a culture of this germ died in 95 days of pulmonary tuberculosis. A cat inoculated in the same manner died in 23 days of generalized tuberculosis. A rabbit similarly inoculated died in 59 days of pulmonary tuberculosis. A rabbit inoculated with a bovine germ for comparison lived 10 days longer than the one inoculated with this sputum germ.

‘It is plain from these experiments that there is a great difference in the virulence of tubercle bacilli from human sources, and that while some of these are not capable of producing serious disease in cattle, sheep, goats and swine, there are others which produce generalized lesions and are very fatal with such animals.

‘You will observe that de Schweinitz has isolated tubercle bacilli from human lesions which when cultivated in the laboratory are of the bovine type, and that he has produced fatal disease in bovine animals by inoculating them subcutaneously with cultures of these bacilli. That is, he has fulfilled the most difficult requirements as to experimental work which those who oppose the theory of the transmission of bovine tuberculosis to man have been able to formulate. The results of these experiments make it necessary to admit either that human and bovine tuberculosis are identical, or that, being different, the bovine form is transmissible to man. There is no third theory by which the presence in human lesions of tubercle bacilli having the characteristics of the bovine type can be satisfactorily explained.’

And he closes by saying: ‘Very recently (July, 1903) Kossel has given some of the results of the investigations of the German Tuberculosis Commission. This commission has studied and tested the virulence of 39 different fresh cultures of bacilli from human tuberculosis. Twenty-three of these cultures were from adults and 16 from children. Among the 16 cultures from children 4 were virulent for cattle. Two of these were cases of primary tuberculosis of the digestive organs, and two others were miliary tuberculosis. Kossel states that while these cultures were not as virulent as the most virulent cultures of the tuberculosis of animals, they were much more virulent than the weaker cultures of cattle tuberculosis. It is plain, therefore, that these cultures were of about the same virulence as the average bovine tuberculosis, and that this commission, working according to the principles laid down by Koch, has found 25 per cent of the cases of tuberculosis in children investigated by them to have been caused by infection with bovine tuberculosis. Whether this is a greater or smaller proportion than some have believed is of little consequence. The figures are definite, and to most of us it would be astounding if it should be found that they are of general application. The danger from bovine tuberculosis can no longer be doubted; and whether it is found that 25 per cent of the cases of tuberculosis in children, or a greater or smaller proportion, are due to infection from animal sources, it is plain that the proportion is sufficiently high to make the prevention of such infection a matter of the greatest importance.’

Dr. George M. Kober, in the *Journal of Medical Sciences*, October, brings forward a mass of evidence in support of the view that tuberculosis can be caused in a human being by means of the ingestion of milk from diseased cows.

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The writer draws these conclusions: (1) Tuberculosis may be transmitted to man in milk from tuberculous cows. The danger from this source is real and cannot be measured by the actual number of recorded cases, but should be judged, in part at least, by the inoculation and feeding experiments, and the accidental wound infections which have established the intercommunicability of bovine and human tuberculosis. (2) The degree of danger may also be estimated by the prevalence of bovine tuberculosis and of forms other than phthisis pulmonalis in man, remembering that the infectious qualities of milk are greatest when the udder is the seat of lesions and that Gebhardt's experiments have shown that tuberculous milk when diluted with the milk of sound animals in the proportion of 1:40 lost its power. (3) The experimental studies also indicate that while the bacilli of human tuberculosis possess different degrees of pathogenic power and are often of feeble virulence for cattle, Koch's assumption that human and bovine tuberculosis are distinct and that human tuberculosis cannot be conveyed to cattle appears to be disproved, and his failure to secure similar results may be attributed to the use of human bacilli of diminished virulence. (4) Recent investigations have strengthened Smith's claim that there are two types of tubercle bacilli—the so-called bovine and human types—possessing certain morphological and biological differences; but it has also been shown that virulent cultures may be obtained from both of these types, which, when inoculated into animals, produce the disease in question. (5) Further research seems desirable with a view of determining the frequency of primary intestinal and abdominal tuberculosis in all cases which come to autopsy, whether the child perished from tuberculosis or not, and in these autopsies the bacteriological examination should be directed to the existence of the two types of tubercle bacilli originally referred to by Smith, and whether the bovine type predominates in the so-called scrofulous lesions. (6) Careful chemical analyses of the milk of tuberculous animals should be made with a view of determining the amount of phosphoric acid as compared with the quantity in normal milk, since it appears probable from Dr. de Schweinitz's bio-chemical researches that the excess noticed by the older chemists is really the results of bacterial activity in the udder of the cow. (7) In the meantime the pathologist has no reason to reverse his opinion as to the identity of human and bovine tuberculosis, and the sanitarian has no reason to assume that the human subject is immune against infection with the bovine bacillus, or is so slightly susceptible as to cause him to relax his efforts in preventive measures.

Dr. Marmorek, an Austrian bacteriologist, who was until recently the leading chemist at the Pasteur Institute, has communicated to the Academy of Science of Paris the results of his experiments in curing tuberculosis. His researches led him to discover a serum or vaccine which he believes is efficacious. He has used it for more than a year, obtaining favourable results in tuberculosis. Dr. Marmorek claims to have made several absolute cures, besides effecting distinct improvement in some advanced cases. He admits, however, that a definite verdict on the merits of the serum can be only obtained after experimentation on a greater scale than he has been able to practise.

Congresses and Meetings.—The Eleventh International Congress of Hygiene and Demography was held at Brussels, September 2 to 8, under the patronage of His Majesty the King of the Belgians.

An animated discussion on the subject of the relation of human and bovine tuberculosis took place, and the conclusion was arrived at that no precautions should be relaxed to safeguard human beings against any possible contagion. A resolution put by Sir Patrick Manson urging all governments to take steps to recognize the mosquito malarial theory, and to enforce its adoption, was carried. A discussion on the plague was held, and a resolution was passed that the conditions of quarantine against the disease should be improved.

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The following desiderata were formulated in concluding the question of plague :

In consideration of the fact that recent data incontestably prove the rôle of rats as agents in the propagation of pest aboard ship, even when there is no case of human pest aboard, and when the ship does not come direct from infected ports; and also in consideration of the security procured by preventive inoculations of antipest serum to crews and passengers brought in contact with the sick: Resolved, That the congress express the opinion that quarantine measures now applied be modified as follows:

1. The limitation, in the largest sense of liberalism, of isolation in lazarettoes and replacement, whenever the sanitary authorities judge it possible, by a simple observation of ten days at the port of arrival, this observation being reduced to five days for passengers who consent to submit to a preventive inoculation of antipest serum, even when these passengers come from a ship having cases aboard during the passage.

2. Limitation for vessels and cargo of the duration of quarantine to the time strictly necessary for the destruction of rats and insects and the complete disinfection of all parts of the vessels and cargo.

3. Organization in all ports, open to international commerce, of a methodic destruction of rats, as well ashore as aboard, and of disinfection, strictly and scientifically controlled, in such a manner that the efficiency of measures taken to destroy rats, insects, and pest bacilli can be officially guaranteed.

4. Obligation for all vessels that put into Mediterranean ports of the Levant or in those of the Red Sea, of the Persian Gulf, of India, of Indo-China, or of other suspected or contaminated countries, to be provided with a sufficient quantity of antipest serum to vaccinate the passengers and all the crew if a case of pest should appear during the voyage.

5. To invite the attention of interested governments to the necessity of appointing sanitary physicians specially instructed with a view to the mission they are to fulfil, commissioned by the controlling power and independent of companies of navigation.

The congress passed a resolution that the International Sanitary Conference that is to meet at Paris, October, 1903, be asked to deliberate on the foregoing desiderata with a view of elaborating a set of regulations for the defence against pest more in conformity with modern science, and with the needs of international commerce.

The next congress will be held at Berlin in 1907, a national congress of hygiene at Marseilles in 1904, a congress of physical education at Geneva in September, 1904, and a section on hygiene will be one of the features of the international universal exposition which Liège is preparing for 1905.

The International Sanitary Conference has been in session in Paris this month. Twenty-five powers are represented at this conference. There are 69 delegates, 39 of whom are members of the medical profession. The invitation to the conference was issued by Italy, and the French ambassador to Italy, Mr. Barrère, presides over the meetings. France is represented besides by Brouardel, Proust, general inspector of the sanitary service in France, Roux of the Pasteur Institute, Calmette of Lille and three other physicians from the French colonies in Africa, with G. Louis, director of consulates. Great Britain is represented by de Bunsen of the British embassy, and two physicians, T. Thomson and F. G. Clemow, with Colonel Richardson of the Indian Medical Service and Mr. Alban. There are 4 official delegates from Germany, including Gaffky of Giessen and Nocht of Hamburg. The delegates from the United States include Surgeon Anderson, medical inspector of the European station, and Col. Gorgas, assistant surgeon-general, U.S.A., late of Havana, both members of the American Medical Association, with Dr. Giddings. The part played by the rats in the dissemination of the plague has been brought to light since the last international conference of the kind, and uniform measures to prevent infection from this source are under discussion.

The American Public Health Association, in which Cuba is now joined to the United States, Canada and Mexico, has held two annual meetings since the date

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of my last report, one in New Orleans December 8-12, 1902, under the presidency of Dr. Henry D. Holton, of Brattleboro, Vermont, and the other at Washington 26th to 30th of this month, under the presidency of Dr. Walter Wyman, Surgeon-General United States Public Health and Marine Hospital Service. Many interesting papers were read and discussed, on the plague situation, the rôle played by the mosquito in the spread of yellow fever, that of the rat, &c., in the spread of plague, on maritime quarantine, on disinfection and disinfectants, &c. The next annual meeting of this association is to be held in Havana, Cuba, under the presidency of Dr. Carlos J. Finlay, who is so celebrated in connection with the discovery of the conveyance of yellow fever by the mosquito.

The Canadian Medical Association held its annual meeting in London, Ont., August 25-28. Three hundred and two members registered at this meeting. Many important papers were submitted and discussed. The next meeting is to be held at Vancouver, B.C.

The Quarantine Stations, &c.—Grosse Isle, Que.—At this station and at its sub-station of Rimouski 475 vessels have been inspected during the year, 445 at Grosse Isle and 30 at Rimouski. This shows an increase of 57 as compared to last year. 74,237 persons were inspected, an increase of 20,858.

Twenty-four vessels arrived with infectious disease.

The admissions to hospital were 322. They included cases of diphtheria, scarlet fever, chickenpox, measles and enteric fever.

The deaths were seven; one from diphtheria, one from scarlet fever, four from measles and one from tuberculosis.

The medical superintendent in his annual report again strongly urges the need of the station of a second steamer, a deep water wharf, a hospital steam sterilizer, and an administrative building at the western end.

As I submitted to you in my last annual report, the question of rebuilding the old wooden detention sheds, which date from 1832 and 1847, will soon have to be met.

Halifax, N.S.—Vessels inspected, 539; an increase of 54 over last year. 68,961 persons were inspected; an increase of 9,785 over last year.

Eleven vessels arrived with infectious disease.

The admissions to hospital were 97. Of smallpox 2, measles 86, scarlet fever 8, and enteric fever 1.

The deaths were fifteen: 13 from broncho-pneumonia, secondary to measles, 1 from scarlet fever and 1 from enteric fever.

Two steamships were quarantined for smallpox, their passengers landed, and the vessel released after the disinfection of the ship and the crew. During the year there were 800 persons at the station for treatment or for quarantine of observation.

A good winter hospital is very much needed at this station, with a capable steward and matron in permanent resident charge, who would keep the building warm and prepared at all hours for the reception of the sick.

The electric lighting of the station—as has been done for Grosse Isle and William Head—is very desirable.

St. John, N.B.—Vessels inspected, 596. Persons inspected, 44,031. Vessels bringing disease, 11. Admissions to hospital, 187. Deaths, 6, viz., measles 2, tuberculosis 2, meningitis 1, diphtheria 1. Persons vaccinated 1,655.

A winter hospital is much needed at this station, of the same nature and for the same reasons as above mentioned for Halifax.

The electric lighting of the station is also very desirable.

Sydney, C.B.—Vessels inspected, 221. No infectious disease has reached this port, except one case of measles ex the ss. *Hestia* from Glasgow.

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The new arrangement for the steamboat service has worked well, and all inspections have been made immediately on the arrival of the vessels, whether by day or by night.

Chatham, N.B.—Vessels inspected, 66. No infectious disease found during the year.

Charlottetown, P.E.I.—Vessels inspected, 15. No infectious disease. The quarantine hospital has undergone thorough repair during this year.

William Head, B.C.—Vessels inspected, 393; persons inspected, 56,199. Of these the steerage Chinese numbered 10,157, and Chinese crew, 5,255. Japanese steerage, 4,484, and Japanese crew, 2,704. Other Asiatics numbered 206. A total of 22,806 Asiatics. On account of the prevalence of plague in the ports from whence these people came, special examination comprising inspection of glandular regions was given to each and all.

The Chinese immigration was somewhat larger than usual, presumably in view of the impending increase in the tax to take place from January 1, next.

Diseases found on vessels arriving: smallpox, measles, mumps, malaria, and beriberi.

No case of plague occurred at the station during the year, but cases occurred on three steamships running to this port. The American ss. *Hyades* lost her head steward from plague in Hong-Kong in April last. The British ss. *Indrasamha* landed a man sick with plague at Keelung, Formosa, in June last, and on the arrival of the Japanese ss. *Kaga Maru* at Yokohama from Seattle and Victoria in June last a cabin boy was landed with suspicious clinical symptoms of plague.

Two new steamship services with European ports have been established. One via South American, Central American and Mexican ports, and the other via the Suez Canal and Asiatic ports. These vessels thus touch at many ports which are subject to some of the graver quarantinable diseases.

The station has now been fitted with the electric light.

Victoria, B.C.—Foreign coasting vessels arrived, 689. None required inspection.

Vancouver, B.C.—Ten vessels were inspected during the last quarantine year.

Temporary frontier and coast inspection.—In addition to these regular stations we have this year given the country the additional protection of extra inspecting officers at the following points, where peculiar threatening of smallpox, or the reported lack of effective health organization to the south of them, seem to make the importation of smallpox most to be feared. Such extra inspections were carried out for greater or lesser periods at the following places: In Cape Breton, Louisbourg; in Nova Scotia, Canso and Yarmouth; in New Brunswick, McAdam Junction; in Ontario, Owen Sound, Thessalon, Bruce Mines, Sault Ste. Marie, Rainy River, Port Arthur and Fort William; in Manitoba, Sprague, Emerson, Gretna, Morden and Crystal City; in the North-west Territories, North Portal, Coutts and Macleod; in British Columbia, Northport (for Rossland and Nelson), Grand Forks, Greenwood, Huntingdon and Blaine.

The North-west Territories.—During the year smallpox appeared in the vicinity of the following points: Onion Lake 1, Milestone 1, Dunn's Ranch 3, Regina 7, Lethbridge 2, Mayton 11, Crooked Lake 3, Calgary 5, Saskatoon 4, Star 2, Jack Fish Lake, 15, Moosejaw 9, Langevin 4, Indian Head 2, Raymond 3, Wolsley 2, Caron 3, Cardston 7, Maple Creek 9, Swift Current 24, Pelletier's Lake 11, Brinsay 9, Muskeg Lake 6, Medicine Hat 4, Lacombe 24, Tantalton 10, Qu'Appelle 2, Yorkton 1, Willow Bunch 1, Halcro 6, Old Man's Creek 3, Magrath 1, Prince Albert 6; also at Carleton.

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Wyangard, Fish Creek, Batoche, Green Lake, Fort à la Corne and Sandy Lake. The average character of the disease was somewhat more severe than during the previous year, yet not severe enough to be fatal, except in four cases.

The disease was chiefly confined to the half-breed population. The Doukhobors, Galicians and Mennonites have shown a marked exemption.

Dr. Patterson, our very efficient public health officer in the Territories, states that he has during the last two years and a half given out about fifty thousand vaccine tubes, and that this general vaccination, previous vaccination, the vaccination of incoming immigrants, and the large number of cases of smallpox of a non-fatal type, render the present population of the Territories a people comparatively immune to smallpox. To-day this disease exists only at two points, Bresaylor and Jack Fish Lake, in the same district.

Dr. Patterson again expresses his high estimate of the courtesy shown him, and of the valuable services rendered at every point by the North-west Mounted Police.

The Yukon Territory.—There have not been any cases of the major infectious diseases in this territory during the year.

Leper Lazaretto, Tracadie, N.B.—There are now at this institution sixteen patients, ten male and six female, three less than at this time last year. There are also two suspicious cases under observation in the neighbourhood. Four deaths occurred during the year, and one new patient was admitted.

The steam disinfector, in which bedding, clothing, &c., can be sterilized and rendered safe before being laundered, and the cinder and ash pit, both recommended in my last annual report, have been provided for in this year's estimates.

Public Works Health Act.—Your inspector, Mr. C. A. L. Fisher, reports that at all the public works inspected by him during the year he found the medical supervision given thereon, the hospital accommodation and medicines provided, and the sleeping quarters for the men when housed together or in tents to be somewhat of an improvement, even on the very good conditions reported last year, which, he says, shows that contractors are trying to carry out as nearly as possible the requirements of the Public Works (Health) Act, and the regulations thereunder.

I have the honour to be, sir,

Your obedient servant,

F. MONTIZAMBERT, M.D.Ed., I.S.O., F.R.C.S.E., D.C.L.,

Director-General of Public Health.

The Honourable

The Minister of Agriculture,
Ottawa.

SESSIONAL PAPER No. 15

No. 2.

(G. E. MARTINEAU, M.D.)

OFFICE OF THE MEDICAL SUPERINTENDENT.

GROSSE ISLE, Quebec, October 31, 1903.

SIR,—I have the honour to submit this, my annual report of the St. Lawrence quarantine service to October 31, 1903.

There were 445 vessels inspected at this station, being an increase of 57 as compared with the year 1902. Of these only 17 were sailing vessels.

The total number of persons examined was 74,237, being an increase of 20,858 over last year. They were divided among the different classes of passengers, &c., as follows:—1st cabin, 3,225; 2nd cabin, 8,963; steerage, 33,965; cattlemen, 2,904; crews, 24,576; stowaways, 604.

I beg leave respectfully to call your attention to the very large increase in the number of stowaways this season, as compared with former years. In 1901 this was 97; in 1902, 171; while this year the number has been 604. Some of the vessels have carried as many as 23 on a single voyage.

Infectious disease was reported or discovered on the following vessels arriving at this station, named in the order of their arrival: ss. *Pretorian*, *Lake Ontario*, *Bavarian*, *Montrose*, *Lake Erie*, *Ionian*, *Kensington*, *Lake Manitoba*, *Dominion*, *Mount Temple*, *Lake Champlain*, *Gladestry*, *Canada*, *Tunisian*, *Parisian*, *Monmouth*, *Lake Michigan*, *Milwaukee*, *Montreal*, *Buenos Ayrean*, *Fremona*, *Nordstjernen*, *Teelin Head*, and *Sicilian*.

The diseases so reported or discovered were: scarlet fever, diphtheria, chicken-pox, measles and typhoid fever.

Twice only persons refused vaccination, although on several occasions parties who had refused to be vaccinated by the ship's surgeon, consented to allow the quarantine officer to do so. The reasons these latter gave for refusal were, 'lack of cleanliness in the methods of the ship's doctor, and neglect to clean or sterilize the lancet that was used on everyone.' I believe that if points were used on board the ships, there would be less trouble for vaccination, especially among British emigrants.

The parties that refused vaccination arrived here on the ss. *Tunisian*, June 19, and on the ss. *Lake Erie*, August 21.

They were landed for the usual period of observation.

This year has been a very busy one at the hospital, where we had up to 132 persons at the same time suffering from different diseases.

Since the opening of the station, this spring, we have always had some patients at the hospital and there are now ten persons therein.

The total number of admissions at the hospital was 322, being an increase of 58 over last year.

The deaths numbered seven, one from diphtheria, one from scarlet fever, four from measles and one from tuberculosis.

One birth occurred in the hospital.

Quarantine Staff.—The Rimouski sub-station continued to be in charge of Dr. A. Lapointe, who made the inspection of the weekly mail steamers.

I visited this advance post, and coming up from thence on the mail steamers, made a detailed inspection between Rimouski and Grosse Isle.

Requirements and improvements.—I can only repeat here, as it has always been done in the previous reports and upon every possible occasion, that the chief require-

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ments at this station are: a strong and suitable second steamboat and a deep-water wharf.

Another deficiency is that of a steam laundrying disinfecting apparatus at the hospital, so as to sterilize the contaminated linens, clothes, bedding, &c.

Buildings.—A new building for the accommodation of the employees has been commenced this year. Another one ought to be erected in the upper division, so as to be used for an office, a surgery, &c.

Some other works and repairs are also absolutely necessary, the list of which is in the hands of our department.

The whole respectfully submitted.

I have the honour to be, sir,

Your obedient servant,

G. E. MARTINEAU, M.D.

Medical Superintendent of the St. Lawrence Quarantine Service.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 3.

(N. E. MACKAY, M.D., M.R.C.S.)

HALIFAX, N.S., October 31, 1903.

SIR,—I have the honour to submit my annual report of the quarantine station at Halifax, N.S., during the year ended October 31, 1903.

We inspected during the quarantine year just ended 539 vessels, an excess of 57 over the previous year and of 228 over the year 1901.

In the same period we examined 8,678 cabin passengers; 6,153 second-class passengers; 32,736 steerage and 21,392 crew. A total of 68,961 souls, an increase of 9,735 over the previous year, and of 38,323 over the year 1901. These facts show that the work of this station is increasing in importance yearly.

Smallpox was discovered on board the ss. *Assyria* from Hamburg, December 24, 1902, and on the ss. *Corinthian*, from Liverpool, on March 23, 1903. In the former the disease broke out amongst the immigrants of whom 534 were on board. The disease was discovered in mustering the passengers. It was of the discrete form and the vesicles were beginning to suppurate. The ship with all on board was sent to the quarantine station, Lawlor's Island, and the crew and passengers were immediately vaccinated. All the immigrants were detained in quarantine of observation for 18 days, but the vessel and crew were released on being thoroughly disinfected. Disinfection was made by sulphur dioxide, mercuric chloride and formaldehyde. The quarantine officer at Boston, the port of destination of the ship, was notified by telegram of the existence of smallpox on board when she arrived in this port. None of the immigrants or crew contracted the disease afterwards; so far as I know.

Besides the case of smallpox there were thirteen cases of measles on board. This disease spread rapidly amongst the children while in quarantine; so much so that we had at one time as many as 40 or 50 patients in the hospital. The mortality was very high, 12 deaths having occurred chiefly from broncho-pneumonia secondary to measles.

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This high mortality seems to me to have been due to the fact that the sick had to be placed in a building that had had no fire in it for months previously.

A good hospital is greatly needed at this station, with a capable steward and matron in charge, who would keep the building at all hours in readiness for the reception of patients and who would also nurse the sick.

The case of smallpox on board the ss. *Corinthian* developed amongst the cattlemen. There were 16 of them, and they occupied quarters which were completely isolated from those of the crew and the other passengers. Furthermore, the patient was put in the hospital and separated from his comrades as soon as he took sick, and before the nature of his illness could be made out, and the danger of contagion practically nil. So I allowed all the passengers to land and sent the vessel, cattlemen and crew to Lawlor's Island quarantine station. The cattlemen were vaccinated, as were also the crew, and the former were kept for 18 days under quarantine of observation. After the vessel was disinfected, and the crew bathed and their effects disinfected, she was released on the 25th, and allowed to proceed on her voyage. The quarantine officer at St. John, the port of disinfection, was notified by telegram of the existence of smallpox on the vessel, and what we had done by way of disinfection.

None of the cattlemen, crew or passengers contracted the disease afterwards, so far as I am aware.

The experience I have had with smallpox in my public and private capacity has convinced me that it is not necessary to detain in quarantine of observation any of the crew or passengers on board a ship on which the disease of smallpox broke out on the voyage except those who occupied the same apartments with the patients, and not even these if they show evidence of recent successful vaccination, and if the case was isolated before the appearance of the eruption. Contagion is practically nil till the rash comes out, and not well marked until the vesicles begin to suppurate. As a precautionary measure, however, it would be well to have them bathed and their effects disinfected. In the case of contacts who do not give evidence of recent successful vaccination, I am of opinion that it is only necessary to detain even them until vaccination has had time to take and that every good take should be released on being bathed and their effects disinfected. If the takes are good it shows the disease is not in the system, and the vaccination practically renders them immune to smallpox. Only the non-takes, and those who take badly and those who refuse to be vaccinated should be kept under observation during the incubation period of the disease.

Minor quarantinable diseases were discovered on board the following vessels: ss. *Bavarian*, from Liverpool, November 21, 1 case of enteric fever—sent to General Hospital for treatment; ss. *Corinthian*, from Liverpool, December 8, 5 cases of measles; ss. *Pretorian*, from Liverpool, December 15, 2 cases of measles; ss. *Armenia*, from Hamburg, April 5, 2 cases of measles; ss. *Assyrian*, from Hamburg, April 25, 5 cases of measles; ss. *Bulgaria*, from Hamburg, May 27, 2 cases of measles; ss. *Siberian*, from Liverpool, June 12, 1 case of scarlet fever—an orphan—sent to infectious disease hospital; ss. *Ark*, from Jamaica, 1 case of mumps, and ss. *Corinthian*, from Glasgow, June 24, 1 case of chicken-pox.

Non-quarantinable diseases were found on the following vessels:—Schr. *Emma and Helen*, from Gloucester, November 10, 1 case of quinsy; ss. *Bavarian*, from Liverpool, November 21, 1 case of tonsillitis; ss. *Tunisian*, from Liverpool, November 30, 1 case of influenza; ss. *Pretorian*, from Liverpool, December 15, 1 case broncho-pneumonia; ss. *Bavarian*, from Liverpool, December 28, 3 cases of la grippe; ss. *Tunisian*, from Liverpool, January 4, 1 case of pneumonia; and the ss. *Pretorian*, delirium tremens, 1, and suicide, 1.

Deaths occurred on the voyage to this port from the following causes:—Phthisis, 1; pneumonia, 6; acute-bronchitis, 1; meningitis, 1; peritonitis, 1; acute-alcoholism, 1; delirium tremens, 1; and suicided, 1.

During the year we had 800 persons at the station under treatment and quarantine of observation.

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In the same period 97 cases of quarantinable diseases were treated as follows: 2 cases of smallpox, 86 of measles, 8 of scarlet fever and 1 of enteric fever.

Fifteen deaths occurred at the station during the year, viz.: 13 from broncho-pneumonia secondary to measles—all these were children under 10 years of age, belonging to the immigrants ex ss. *Assyria*; one from enteric fever—a middle-aged woman belonging to same contingent—and 1 from scarlet fever.

I have to note with approval that vessels from New York and ports north of it are again exempt from quarantine inspection.

It is to be regretted that the repairs to the ss. *Argus* were not gone on with more promptly than they were. The boat was laid up at Mr. Esdale's request, and the machinery taken apart on October 6, and nothing has yet been done to her.

After a few years of observation and experience we found that inspecting vessels at night did not help the trade of the port to any appreciable degree, for the unloading of ships arriving after 8 or 9 p.m. did not begin usually until 7 in the morning, and besides immigrants cannot be properly examined for disease with artificial light. So for the past year we have endeavoured to dispose of night work as much as possible, and with the co-operation of ship owners and ship agents, we have been fairly successful. The change only now needs to be embodied in the regulations. It is better for all concerned to have inspections made in daylight. This is the practice in other countries.

The plumbing work which was being repaired at the station, when I made my last report, has been finished, and is found to work so far satisfactorily. New upright radiators were placed in the bath-rooms; they are quite an improvement on the old ones.

In my last report I called attention to the condition of the roofs of the hospital, the first-class and the third-class detention buildings. They are leaking badly and need to be attended to. The roof of the sulphur-blast building has also given way and needs prompt attention, otherwise the machinery will be damaged.

In last year's report I called attention to the fact that the ss. *Argus* is too small for the quarantine service of this port. She has no accommodation for carrying the sick to Lawlor's Island, and neither has she suitable quarters for the crew at night, and besides it is not safe to approach a large ship in motion with her, especially if there is any wind blowing or rough sea on. We need badly a larger boat with better accommodations.

I have again to call attention to the need of partitioning off in rooms the third-class detention building for the better accommodation of immigrants. Our accommodation should at least be in keeping with the quarters provided for this class of passengers on board of immigrant ships. The small hospitals should be divided off in two or three rooms each and the ceilings and floors painted. We find these buildings very convenient when there are only a few sick at the station. They are easier made comfortable than the large hospital.

The signalling of incoming vessels by the signal station still continues very unsatisfactory.

I have the honour to be, sir,

Your obedient servant,

N. E. MACKAY, M.D., M.R.C.S.,

Quarantine Officer.

The Honourable

The Minister of Agriculture,
Ottawa.

SESSIONAL PAPER No 15

No. 4.

(J. E. MARCH, M.D.)

ST. JOHN, N.B., October 31, 1903.

SIR,—I have the honour to submit my report for the year ending October 31, 1903.

During this time there were inspected at this station 596 vessels and 44,031 persons, of whom 26,885 were passengers.

One thousand six hundred and fifty-five persons were vaccinated.

Nine hundred and twenty-eight were quarantined at the station for a total of 10,150 days, and 187 were admitted to and treated in hospital for a total of 2,805 days.

Six deaths occurred amongst the children and infants landed here from the following named causes, viz.: measles, 2; tuberculosis, 2; meningitis and laryngeal diphtheria one each.

One child was born.

Quarantinable diseases were reported by or discovered upon the arriving vessels, as follows:—

November 29—SS. *Lake Erie*, measles.

December 6—SS. *Lake Megantic*, measles.

December 13—SS. *Lake Champlain*, smallpox.

December 29—SS. *Lake Ontario*, chicken-pox, measles.

January 5—SS. *Lake Erie*, chicken-pox, measles, diphtheria.

February 9—SS. *Lake Erie*, measles.

February 18—SS. *Lake Megantic*, measles, diphtheria, meningitis.

March 12—SS. *Lake Ontario*, measles.

March 13—SS. *Lake Simcoe*, measles.

March 28—SS. *Lake Erie*, measles.

April 2—SS. *Lake Megantic*, erysipelas, pneumonia, measles.

The last case was discharged from hospital May 26. Since then there have been no further admissions.

I believe that I am again able to report that no quarantinable disease has been permitted to enter the country through this port during the year.

Up to August 15, when the inspection of coastwise vessels from ports north of New York ceased, fifty-one schooners had qualified for and received from me the quarantine officer's time clearance, which was authorized for use at this station last year. These vessels took their crews at St. John and no change could be made in the personnel without invalidating the time clearance. The system seems to be well adapted to this class of coastwise vessels as they are operated at St. John, and, should it be found necessary to re-impose general inspection and vaccination, I would advise that it be given a further trial.

Numerous special reports dealing with the work and needs of the station have been submitted for consideration during the year.

The instructions in regard to the treatment of vessels from plague ports, and all others which have been received from time to time, have been strictly carried out.

I have the honour to be, sir,

Your obedient servant,

J. E. MARCH, M.D.,

Quarantine Officer.

The Honourable
The Minister of Agriculture,
Ottawa.

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No. 5.

(H. RINDRESS, M.D.)

NORTH SYDNEY, October 31, 1903.

SIR,—I have the honour to submit my report for the year ended October 31, 1903.

The total number of ships inspected for the year just ended is 221: 189 steamships, 32 sailing vessels.

I am glad to say that, with the exception of one case of measles on the ss. *Hestia*, arriving here on July 14 from Glasgow, no quarantinable, contagious or infectious disease has reached here from any foreign port.

Smallpox of a mild type, yet undoubtedly smallpox, has been in the county of Cape Breton during the last eight months. At present there are a number of cases in different parts of the county, but in no case has a death been reported. The disease was brought here at first from Newfoundland.

Since navigation opened this year all inspections have been made immediately on arrival of the ships, whether by day or by night.

The steamboat service has been satisfactory.

I have the honour to be, sir,

Your obedient servant,

HORACE RINDRESS, M.D.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 6.

(P. CONROY, M.D.)

CHARLOTTETOWN, P.E.I. October 31, 1903.

SIR,—I have the honour to submit my report for the year ending October 31, 1903.

I am pleased to state that no case of disease of an infectious character was found to exist on board any vessel entering at this port during the past year. The hospital has undergone since my last report very thorough and much needed repairs, and it now affords suitable accommodation for the sick.

Vessels coming from ports in Canada, as well as those from points north of New York, being exempt from quarantine inspection during the greater part of the season, renders the numbers of inspections much less than last year.

The total number of arrivals from ports requiring inspection was fifteen.

All of which is respectfully submitted.

I have the honour to be, sir,

Your obedient servant,

P. CONROY, M.D.,

Inspecting Physician.

The Honourable
The Minister of Agriculture,
Ottawa.

SESSIONAL PAPER No. 15

No. 7.

(J. MACDONALD, M.D.)

CHATHAM, N.B., October 31, 1903.

SIR,—I have the honour to submit my report for the quarantine year ending October 31, 1903.

Sixty-six vessels were inspected during the year. I am happy to say that no disease of a contagious or infectious character was found on any of the arrivals at this port, and all were admitted to pratique immediately after inspection.

The hospital buildings and caretaker's residence are in fairly good condition. The flues of both buildings were found to be damaged, but were thoroughly repaired during the past summer.

I most respectfully recommend a small outlay for lumber, wherewith to construct a suitable shed or house to protect our boat from the sun and weather during the winter months.

Mr. Currie, the caretaker, is a good carpenter, and could construct the building if furnished with the material. The cost for lumber, nails, shingles, &c., should not exceed twenty-five dollars.

I have the honour to be, sir,

Your obedient servant,

J. MACDONALD, M.D.,

Quarantine Officer.

The Honourable

The Minister of Agriculture,
Ottawa.

No. 8.

(A. T. WATT, M.D.)

VICTORIA, B.C., October 31, 1903.

SIR,—I have the honour to submit this my report for the year ending October 31, 1903.

During the twelve months just ended there were 393 vessels inspected at this station. This is a smaller number than arrived last year, and is to be accounted for, to a great extent, by a long continued strike in two of the coal mines, which so reduced the output that no coal was procurable for export for about three months. Most of the colliers were consequently laid off. Sailing vessels have also been fewer in number, they having been largely displaced latterly by steamers, particularly in the old country trade. Regular steamship communication is now to be had with European ports—one service via South American, Central American, and Mexican ports (Kos-

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mos line) and the other via Suez canal and Asiatic ports (joint service by China Mutual and Ocean SS. lines). The establishment of these services is noteworthy, as the steamers touch at a great many ports en route which are more or less subject to outbreaks of the graver quarantinable diseases.

The persons examined were as follows:—Cabin passengers, 10,098; steerage, 20,953; members of crew, 25,148. The number of Chinese steerage passengers was considerably increased over that of previous years owing to the rush to get over before the per capita tax is increased from \$100 to \$500, as it will be on January 1, 1904. The new tax is conceded to be a prohibitory one, so that there will soon be a great decrease in this class of immigration, a consummation entirely desirable from a quarantine standpoint. There will still, however, be a considerable number of Chinese travelling as these people, after being here for a few years, return to China on a visit. This they can do without having to pay the poll-tax again, provided they return here within one year. Emigration from Japan to Canada has been altogether restricted by the Japanese government. Almost the entire number of Japanese steerage passengers are booked for United States points. The number of these passengers examined here was 4,484, including 353 women, and the Japanese members of the crew were 2,704. The Chinese steerage numbered 10,157, including 19 women, and Chinese crew, 5,255. Other Asiatics numbered 206. These all underwent disinfection of their persons and effects before embarking, so that it was not necessary to perform any routine disinfection at this station during the past twelve months. On account of the prevalence of plague in the ports from whence these people came, special examination comprising inspection of glandular regions was given to each and all.

The following diseases were found on vessels in the course of the year, namely:—Smallpox, measles, mumps, malaria, and beri-beri.

One vessel only had to be detained in quarantine during the past year, this being the British barque *Ancona*, which arrived January 9, from San Francisco, and on which one sailor was found with smallpox in the desiccating stage. The crew were landed for observation but no further case developed. The vessel was fumigated and towed to her loading port.

Reference must be made to three of the oriental liners on which cases of plague were discovered while in other ports. The American ss. *Hyades*, while in Hong Kong during April, lost the head steward from plague. The body was found at the bottom of the dry-dock, the man evidently having fallen from the gang plank. The post mortem examination brought out the fact that he had been suffering from plague. He had been off on shore leave for some days when he must have acquired the disease. The steamer was quarantined in Hong Kong before being allowed to start on her voyage. The British ss. *Indrasamha* was quarantined in Keelung, Formosa, where she landed on June 16, one of her Chinese firemen ill with plague, from which he died two days later. The steamer reached here on July 20 without further misadventure. On the arrival of the Japanese ss. *Kaga Maru* at Yokohama, June 15, from Seattle, one of the Japanese cabin boys was found to have fever and an enlarged axillary gland. The vessel was declared infected with plague and ordered into quarantine. Bacteriological investigation of the case was carried on but with negative results. Over 100 rats caught on the steamer were also examined but without the finding of any plague bacilli. Further clinical observation of the case also made it appear doubtful as to its being a true case of pest. The passengers and crew were, however, held in quarantine for the regular period but none became ill. The sick man made a quick recovery. If this case were really one of plague it most certainly would have to be attributed to infected rats on board the vessel, since direct infection is precluded by the long period elapsing from the time the steamer was in any infected port. This period would be about eight weeks from Hong Kong and six from Japan.

In regard to plague in ports in regular communication with British Columbia, I have to report that the usual epidemic occurred in Hong Kong and Amoy, and that

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cases, although few in number, have continued to appear in other parts of China, in Japan, Formosa, Philippine Islands, Australia, and Honolulu, and also in San Francisco. In Chile, Peru, and Mexico the disease has manifested itself for the first time during the past year. At Mazatlan in Mexico, to which place the disease is said to have been brought from San Francisco, there was a sharp outbreak of over three hundred cases.

Smallpox has become quiescent in Asiatic ports, this being the first year for a number past in which cases of smallpox have not been found on oriental liners. There have been small outbreaks of smallpox in the neighbouring states from time to time, and quarantine has been put on against certain places while the cases continued to be reported, but no general quarantine has been necessary along the border as during previous two years. Epidemics of cholera, but not severe ones, have been reported from Amoy and Shanghai. Many of the cases reported from Shanghai were amongst the local shipping. On one of the coast boats the majority of the crew succumbed to the disease.

During the past year the lighting of the station by electricity has been carried out. This is a much appreciated improvement and has added much to our convenience. The wharf and grounds are lighted with the arc light while the several buildings are fully lighted by incandescent lamps. The permanent staff at the station has been added to by the appointment of an electrician.

Arrangements are now being made for extensive improvement to the wharf, which will give a way from the disinfecting building to the hospital and the saloon passenger quarters and also will enable passengers to be so handled in going through with the disinfecting that those who have passed through the same may be kept completely separated from those who are waiting their turn. At present a certain portion of the wharf has to be used in both going to and coming from the bath-rooms, and constant watchfulness and care is required to avoid re-infection. With the new improvement to the wharf people will pass on in a circle going one way and returning by another, so that all trouble such as we have had to contend with will be avoided. Appropriations for several other improvements are also available, and it is hoped the work will be proceeded with ere long.

I have the honour to be, sir,

Your obedient servant,

A. T. WATT, M.D.

Supt. B.C. Quarantines.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 9.

(W. H. K. ANDERSON, B.A., M.B.)

VICTORIA, B.C., October 31, 1903.

SIR,—I have the honour to submit the following report of the laboratory at William Head for the quarantine year 1902-3.

The various processes concerned in the manufacture of Haffkine's plague prophylactic were carried out until the month of June, when this work was discon-

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tinued, supplies of this prophylactic fluid being then procurable from regular manufacturers.

Cultures of cholera and kindred germs received from the Minnesota State Board of Health have been investigated and kept alive for further study. Typhoid and other cultures have been got from time to time from the Provincial Board of Health of British Columbia.

The new laboratory building has proved most satisfactory. It is heated by hot water, lighted by both gas and electricity, and supplied with hot and cold water. A large number of new instruments have been added to those already in use. Chiefly, I might mention a new model Zeiss microscope, with the most recent lenses and appliances. It has already proved an immense boon. Other additions include a large incubator, and a Colt acetylene gas machine of the latest design. This latter has just been installed, and is giving entire satisfaction, being used for illuminating purposes, to heat the incubators and to supply the Bunsen burners.

An additional list of bacteriological appliances and supplies has been authorized, and they are now under way, and will still further increase the value and efficacy of this laboratory.

I have the honour to be, sir,

Your obedient servant,

HAROLD ANDERSON, *B.A., M.B.*

The Honourable
The Minister of Agriculture,
Ottawa.

No. 10.

(R. L. FRASER, M.D.)

VICTORIA, B.C., October 31, 1903.

SIR,—I have the honour to submit my report for the year just ended.

No case of contagious disease was found on any vessel touching here during the year.

Coasting vessels from foreign ports north and south of here are by order exempt from inspection for the present.

I have the honour to be, sir,

Your obedient servant,

R. L. FRASER, *M.D.*

Quarantine Officer.

The Honourable
The Minister of Agriculture,
Ottawa.

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No. 11.

(L. N. MacKECHNIE, M.B.)

VANCOUVER, B.C., October 31, 1903.

SIR,—I have the honour to submit this, my report, for the year just ended. The number of vessels inspected was 10.

No case of contagious or quarantinable disease arrived at this port during the year.

The inspection of vessels from Blaine and Whatcom on account of smallpox, established February 26, was discontinued September 30.

Inspection of vessels from San Francisco is being continued for plague.

I note the estimates provide for the installation of a telephone at Point Atkinson lighthouse. This will be of great advantage to this port in many ways, and especially so to the quarantine officer.

I have the honour to be, sir,

Your obedient servant,

L. N. MacKECHNIE, M.B.,

Quarantine Officer.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 12.

(JAMES PATTERSON, M.D.)

WINNIPEG, October 31, 1903.

SIR,—I have the honour to report that during the year ending to-day smallpox developed in the vicinity of the following points in the North-west Territories:—

Onion Lake, 1; Milestone, 1; Dunn's Rancho, 3; Regina, 7; Lethbridge, 2; Mayton, 11; Crooked Lake, 3; Calgary, 5; Saskatoon, 4; Star, 2; Jackfish Lake, 15; Moosejaw, 9; Langevin, 4; Indian Head, 2; Raymond, 3; Wolseley, 2; Caron, 3; Cardston, 7; Maple Creek, 9; Swift Current, 24; Pelletier's Lake, 11; Bresaylor, 9; Muskeg Lake, 6; Medicine Hat, 4; Lacombe, 24; Tantallon, 10; Qu'Appelle, 2; Yorkton, 1; Willow Bunch, 1; Halcro, 6; Old Man's Creek, 3; Magrath, 1; Prince Albert, 6.

These figures are not absolutely correct, but they are as nearly so as I can make out from the reports I have had.

Besides the above points and cases the disease prevailed quite extensively, early in the year, at Carleton, Wyngard, Fish Creek, Batoche, Green Lake, Fort LaCorne, and Sandy Lake. I have not any report of the number of cases at each of these points but they were quite numerous.

The average character of the disease was somewhat more severe than during the preceding year; yet not severe enough to be fatal except in four cases.

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As previously the cases were largely confined to the native half-breed element. At Moosejaw, Lacombe, Milestone, Raymond, Mayton, Lethbridge, Calgary, Langevin, Wolseley, Caron, Cardston, Indian Head, Regina, Yorkton, Magrath and Old Man's Creek, the parties affected were white citizens. Up to the present the Doukhobors, the Galicians and the Mennonites have been entirely exempt, with perhaps the exception of two cases reported from Star; from the names given I judge them to be Galicians.

I continued the free distribution of vaccine and during the two years and a-half that I have been connected with this work, I have given out about fifty thousand vaccine tubes. All of this was requisitioned for by school trustee boards, boards of health and private individuals. I believe it was all honestly used and that from the reports, verbal or otherwise, I have received, a very large proportion of the vaccinations were successful. This general vaccination, previous vaccination, the vaccination of incoming immigrants and the large number of cases of smallpox of a non-fatal type, render the present population of the Territories a people comparatively immune to smallpox. To-day the disease exists only at two points, viz.: Bresaylor and Jackfish Lake.

I have much pleasure in again expressing my high estimate of the courtesy shown me and the valuable services rendered at every point by the North-west Mounted Police.

I am, sir, your obedient servant,

JAMES PATTERSON, M.D.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 13.

(A. C. SMITH, M.D.)

TRACADIE, N.B., October 31, 1903.

SIR,—I have the honour to submit for the information of the department the following report on the Leper Hospital at Tracadie, N.B., for the twelve months ending on this date.

There are to-day registered on the books of the Lazaretto the names of sixteen persons—ten males and six females—the youngest nine and the oldest sixty-four years of age. Of these, eleven are of French, three of Icelandic, and two of English origin. Classifying these patients, we may represent the number in the first stage of leprosy to be five; in the second, seven; and in the third, four. There were four deaths during the year, and one new case was admitted from another province. I am at present giving attention, in a neighbouring parish, to the condition of two cases developing suspicious symptoms.

There was more than the usual amount of pulmonary and enteric troubles among the inmates during the year. Lepers respond readily to treatment in these and other intercurrent affections. The frequent illness of those of the patients who are using chaulmoogra oil and creolin caused interruptions in the use of these drugs. But there is no doubt that while under their use the effects are beneficial; the patients all assert that they feel much stronger and better; the tubercles disappear, and the swollen faces and hands become reduced to nearly a normal condition. The majority

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of the inmates are able to take daily out-door exercise, and all seem to find enjoyment in life.

The year has been uneventful in the history of the institution. I have again to report that leprosy is steadily decreasing in all our outlying districts; very noticeably so since stricter outside precautionary measures and prompt segregation have been systematically enforced. The absolute number of lepers is much reduced, and the reduction in ratio of the population is still much greater.

On looking over the register containing the history of our leprous families, and of their neighbours free from even hereditary taint of leprosy who associated freely with them and became leprous, one readily becomes convinced of the communicability of the disease through infection. The absence of the disease in those who lived in the immediate neighbourhood of leprous persons but kept aloof from them is very noticeable. The preponderance of authority is in favour of the theory that leprosy is communicable by means of a cut, sore, or abraded surface. This view is confirmed by my own personal investigations. When those affected are not early removed to the lazaretto but remain at home unsegregated other members of the family become leprous.

Mr. Jonathan Hutchinson, of London, England, who for many years has been studying leprosy in foreign parts, is of the opinion that the disease is due to the eating of badly-cured or decayed fish. He believes that eating food from a leper's hands may introduce the bacillus into the stomach where it must be deposited to cause the disease, but admits that leprosy may in exceptional circumstances be communicated from person to person. I am informed by some of our older people that in former days, and even as late as thirty years ago, the inhabitants living along our shores would not eat fresh or well-cured fish, but laid it aside until tainted. 'They wished to have some taste to it.'

The Tracadie lazaretto is fulfilling its object: the segregation of those who would be a danger to the public, and the giving of every possible comfort to those condemned through no fault of their own to its life of seclusion.

I have the honour to be, sir,

Your obedient servant.

A. C. SMITH, M.D.

To the Honourable

The Minister of Agriculture,
Ottawa.

No. 14.

(CHAS. A. L. FISHER, J.P.)

October 31, 1903.

SIR,—I have the honour to submit this my report as Public Works (Health) Inspector for the twelve months ending October 31, 1903, and to append hereto the reports I have received from medical officers, engineers, or contractors, employed in their said capacity, on a majority of the various public works that have come under my personal inspection.

Since my last report I have again covered the territory in the Dominion from the Atlantic to the Pacific Oceans, and have visited and inspected all public works coming

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under the application of the regulations in force under the Public Works (Health) Act, 1899, which have been brought to my notice.

The year has been an exceptional one in the almost general non-appearance of contagious or infectious diseases among the men employed on the various public works coming under my inspection.

I am pleased to be able to report that at the said public works inspected I found the medical supervision given thereon, the hospital accommodation and medicines provided, and the sleeping quarters for the men when housed together or in tents, to be somewhat of an improvement, even on the very good conditions reported last year, which shows that contractors are trying to carry out as nearly as possible the requirements of the Public Works (Health) Act, 1899, and the regulations thereunder.

In giving a detailed report, as hereunder, of the public works coming under the regulations of the Public Works (Health) Act, 1899, which I have visited and inspected during the past twelve months, I will classify the same under four heads, viz.: canals, railways, bridges, other public works.

CANALS.

The works of this kind carried on by the Dominion Government, on which a sufficient number of men were employed to bring them under the application of the regulations of the said Act, were four.

Balsam Lake Division of Trent Canal, Section No. 2.—These works are near the village of Kirkfield, Ont., and are under contract to Messrs. Larkin & Sangster.

I found from 150 to 200 men employed thereon, many of them living in their own homes, or boarding with private families in the neighbourhood.

The contractors provide a boarding house which is little used, although kept in good sanitary condition, and wholesome food supplied.

Tents and buildings are kept for hospital use if necessary.

A number of the employees are Italians, who live in shacks outside the camp, and which are neither sufficiently cleanly, nor properly ventilated.

No cases of contagious disease had developed up to the time of my inspection, and the employees generally (including the Italians) had been in good health.

These works are under the medical charge of John MacKay, M.D., the summary of whose report thereon is as follows:—

WOODVILLE, October 28, 1903.

Report Section 2, Balsam Lake Division, Trent Canal.

Dear Sir,—In my last annual report I was enabled to say that there was not a single death on the works, not an accident worth reporting, and not a bone broken during the year.

I regret to have to report two deaths during this year, one a Canadian, from double pneumonia, and in which I had called in consultation, the other an Italian, who was crushed to death by a car falling off its tramway.

In the last case, Dr. Wood, coroner, made inquiries on the ground, but did not deem an inquest necessary.

Another Italian fell about 20 feet, and broke his leg. As he was anxious to go to Toronto, where he had relatives, I sent him by train to the Toronto General Hospital where he made a good recovery.

Another labourer stepped on a nail, which passed through his foot, breaking a bone in its course. This man made a tedious recovery.

Mr. Sangster, the contractor, made him a fair offer of compensation, which he refused, and brought an action for damages, which was tried before Justice McMahon, and dismissed with costs.

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There were besides a number of trifling injuries, colds, and stomach and bowel troubles, but during the year not a case of any contagious disease.

The number of men employed were last winter about 50, during the summer about 175, of whom one-third were Italians, living in their own ill-ventilated and dirty shacks, subsisting on the poorest of diet, but still fresh and rosy in appearance, and able to do a good day's work.

These Italians are fairly temperate, and are peaceable and thrifty.

J. MacKay, M.D.

Balsam Lake Division of Trent Canal, Section No. 3.—These works are near the village of Gamebridge, Ont., and are under contract to Messrs. Brown & Aylmer.

I found about 150 men employed thereon at time of inspection, a portion of whom are boarded and lodged by the contractors. The sanitary condition of the camp was good. The Italians, who lodge and board themselves, seemed to be thriving on their poor food and in their ill-ventilated shacks.

There had been no outbreak of any contagious disease, and the general health and condition of the men were good. Hospital quarters are provided for in case of necessity. The medical supervision of the employees is in charge of A. Grant, M.D., of Beaverton, Ont.

BEAVERTON, Ont., October 31, 1903.

DEAR SIR,—I have the honour to submit to you a report of the sanitary condition of Section No. 3, Trent Canal, for the year ending October 31, 1903.

I am pleased to inform you that the general health of the men has been good. No contagious diseases. There were a few accidents, two fractures, and some minor troubles.

The boarding houses are very comfortable, and kept in a fairly sanitary condition. Water supply is good.

Hospital accommodations are in accordance with regulations of Act for the preservation of health on public works.

I am your obedient servant,

A. GRANT.

Welland Canal.—These works are at Port Colborne, Ont., and are under contract to Messrs. Hogan & Macdonell. About 150 men were employed thereon, nearly all of whom boarded and lodged in the neighbourhood.

All sanitary conditions were being well looked after by the contractors.

There had been no outbreak of disease on the works, and the health of the men had been excellent.

Temporary hospital accommodation is always at hand, but in the case of serious accident or disease the men are sent by rail to the permanent hospital at St. Catharines, at the expense of the contractors.

The appointment of a regular supervising medical officer is not necessary, as the medical men of Port Colborne can always be secured within a few minutes.

St. Andrews Rapids Canal.—These works are near Winnipeg, Man., and consist of the construction of a lock and dam, for which Messrs. Kelly Bros. & Co. are the contractors.

About 120 men were employed thereon. Sanitary regulations were being well looked after, and all necessary hospital accommodation was provided at Winnipeg. There had been no outbreak of disease, and the health of the men was of the best. Medical attendance has been provided by the contractors when required for trivial accidents, but no permanent medical supervisor is necessary under the conditions existing.

RAILWAYS.

Public works of this class have been carried on to a greater extent the past year in Manitoba, the North-west Territories and British Columbia, than formerly, thereby adding extensively to the railway mileage of Canada, and opening out large tracts of fine farming land for settlement.

In the province of Nova Scotia very considerable work is being done in the construction by Messrs. Mackenzie, Mann & Co., of a shore line railway from Shelburne to Halifax, with branches.

Canadian Pacific Railway.—This company has had under construction in the past twelve months, twelve branches, extensions, or straightening out works, to their lines in the provinces of Quebec, Ontario, Manitoba, the North-west Territories, and British Columbia.

Having visited all these in my official capacity, I am pleased to report that at that time I found the regulations under the Public Works (Health) Act, 1899, being carefully carried out, excellent hospital accommodation provided, the men comfortably housed in tents or buildings, and well fed, the camps and quarters kept in good sanitary condition, and medical supervision by a duly qualified physician in each and all of said works where necessary.

There had been no outbreak of contagious disease, and the health of the employees had been of the best.

I give below the extent and location of these various works, and append thereunder a report thereon lately received from the medical officer of each, as far as such have come to hand.

Labelle Extension—(from Labelle to Nominigue, Que., about 28 miles). This work was under contract to Messrs. D. R. McDonald & Co. About 300 men were employed thereon.

The contractors board and lodge about 100 of these in tents, the balance, being Italians, live in tents supplied by the contractors, but board themselves.

Sanitary regulations are well looked after. Tents are on hand for isolation purposes. There is no permanent hospital, patients being sent by rail to the Montreal General Hospital or Hotel Dieu.

The medical officer in charge is Dr. C. Cartier, of L'Annonciation, a synopsis of whose report to me I append as under.

L'ANNONCIATION, October 30, 1903.

Dear Sir,—I send you the report *re* the health and condition of employees on the Canadian Pacific Railway, Labelle extension.

Number of men employed, 250 to 300, or over. There are several camps, and the men are housed in tents, with some sleeping cars. There has been no outbreak of contagious disease.

There have been some trivial accidents, and two deaths, one an Italian boy who fell on the rail and cars passed over both legs. He died from hæmorrhage.

The other, a case of appendicitis, who was sent by his request to his friends in Cornwall, Ont., where he died at the hospital there.

Yours, truly,

C. CARTIER, M.D.

Cartier Section—(North Bay to Sudbury, reduction of grades). This work was under contract to the Canadian Construction Company.

About 200 men were employed.

There were good sanitary regulations, with hospital accommodation at Sudbury, Ont. There had been no outbreak of contagious disease.

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These works were under the charge of Drs. Struthers and Arthur, of Sudbury, as medical supervisors, but no report has been received from them.

Fort William, Ignace and Rat Portage Sections—(reductions of grades, Fort William to Winnipeg, Man.). The contractors for this work were Messrs. Foley Bros., Larson & Company.

About 400 men were employed, who were distributed over the various camps, and were boarded and lodged in tents by the contractors.

Tents were on hand for isolation purposes if necessary, and the permanent hospital used was at Rat Portage, Ont.

The medical supervisors over the works were Drs. Scovil and Gunne, of Rat Portage, whose report thereon is as follows:—

RAT PORTAGE, October 19, 1903.

Dear Sir,—We beg leave to report as medical supervisors of construction work on Canadian Pacific Railway between Winnipeg and Fort William.

Visits were made by us every two weeks, giving the men a chance of being attended to each week. Medicines and supplies of all kinds were placed in each camp, and renewed from time to time as required, timekeepers being given full instructions as to using them.

At Rat Portage we had use of Royal Jubilee Hospital, the men being received there when their needs demanded such attention.

On our visits we thoroughly inspected all the camps, and saw that all refuse was burned; also saw carefully after the water supply. As a result of this, there have been no cases of infectious disease in the camps; in fact there has been very little sickness of any kind. Always found the contractors ready to carry out any instructions given them.

They have carefully looked after the comfort and welfare of the men in every way, the camps being large, airy, and well fitted up in every way.

We have the honour to be,

Your obedient servants,

SCOVIL & GUNNE.

Yorkton Extension—(Tracklaying, ballasting and surfacing). This work was being done by the Canadian Pacific Railway construction department of Winnipeg, under J. G. Sullivan, division engineer of construction, and T. S. Armstrong, as engineer in charge. About 120 men were employed thereon. A. T. Condell, M.D., was the medical officer in charge, and as he also had charge of the Kirkella branch of Pheasant Hills extension, his report for both will follow my report on the latter.

Yorkton Extension (grading, &c., 30 miles).—The work on this extension was under contract to J. D. McArthur, of Winnipeg, Man. About 75 men were employed. There had been no contagious disease, and the sanitary regulations were well looked after. No regular medical officer was in charge, but the works were casually looked over by Dr. Condell, who had charge of the adjoining section.

Pheasant Hills Extension—(Kirkella to Neudorf). This work was being done by the Canadian Pacific Railway construction department, with J. G. Sullivan, Winnipeg, division engineer, and W. P. Cotton, engineer in charge of the works.

About 350 men were employed thereon. There had not been any outbreak of contagious disease, and the health of the men was generally good. Temporary hospital accommodation was always provided, but the hospitals at Brandon and Winnipeg were used when necessary. A. T. Condell, of Elkhorn, was the medical officer in charge, and his report to me for the year on the Yorkton extension and the Kirkella branch follows.

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ELKHORN, MAN., October 30, 1903.

Dear Sir,—I have the honour to submit my annual report of the health of the men engaged in Canadian Pacific Railway construction on the Kirkella and Yorkton branches:—

Kirkella Branch.—About 300 men on an average have been employed. Labour employed has been British, Scandinavian, Galician, and latterly a few Italians.

As in last year's works, we have been enabled to use Brandon and Winnipeg hospitals. Every convenience and facility has been given by the company for the early removal of all patients requiring hospital treatment. There has been very little sickness, and very few accidents during the progress of the work. There has not been a single case of acute infectious disease.

A few cases of gastritis, two of acute nephritis, somewhat alarming but soon clearing up.

Accidents.—Only one fatality, that of a Galician injured on June 1 at Sacanville by climbing on moving gravel train; had right foot and left leg crushed above the ankle. He was immediately removed to the hospital and injuries attended to, but failed to recover. There were some smaller handcar accidents, but these injuries were not serious. One pumpman sustained a fracture of both bones of right forearm.

The instructions of your department were closely followed.

The condition of the camps and attention to sanitary measures marked an advance on the previous year.

Yorkton Extension.—About 120 men were employed on this work. As the work was largely that of surfacing and ballasting, no serious accidents or injuries occurred. The health and general condition of the men were excellent throughout. One case of erysipelas occurred, and one case of acute bronchitis.

The utmost attention to the health and comfort of the camps was exercised by the company's officers.

All of which is respectfully submitted.

I have the honour to be, sir,

Yours faithfully,

A. T. CONDELL, M.D.

Pheasant Hills Extension—(Neudorf to Jumping Deer Creek).—This work, 42 miles, was under contract to J. D. McArthur, Winnipeg. About 200 men were employed thereon. These were housed in tents, and boarded by the contractor.

There had been no outbreak of contagious or infectious disease, and the health of the men was remarkably good.

Sanitary regulations were well looked after, and temporary hospital accommodation was always provided.

C. M. Pierson, M.D., has been the medical officer in charge of the works, and his report to me thereon is as follows, viz.:

NEUDORF, ASSA., October 30, 1903.

Dear Sir,—I have been on the construction since August 1, and report a pretty clean bill of health, there having been no sickness of any importance, with the exception of diarrhæa for the first couple weeks or so, due to alkali water.

I have inspected the tents, cook camps, &c., and found everything satisfactory at every visit.

At each camp one roomy tent, heated, &c., was kept for the benefit of possible patients. I have only had to isolate one patient, a case of erysipelas, and have encountered no other contagious or infectious disease. There have been no deaths from any cause.

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Owing to the nature of the country, sanitary regulations have been easy to carry out.

Hoping that you will find this report satisfactory, and expressing my regret that I did not have the opportunity and honour of meeting you while you were in this part of the country,

I am, yours truly,

C. M. PIERSON, M.D., C.M.

Broadview Section—(Reduction of grades Flemming and Broadview).—This work was under contract to P. Lamb. Only a comparatively small body of men were employed thereon. Their health was good, there having been no outbreak of disease, and sanitary regulations were well attended to. There was no regular medical officer in charge, that not being necessary.

Arcola-Regina Extension—(113 miles; grading, bridging, &c.).—This work was under contract to Messrs. Foley Bros., Larson & Company. A. McCullough, engineer in charge. The number of men employed was about 300. They were housed in tents, and well supplied with the best of food by the contractors.

The health of the men was of the best. There were no cases of contagious or infectious disease, with the exception of two or three cases of mumps which were properly isolated and no further cases developed.

Good permanent hospital accommodation was at hand at Regina.

J. A. Graham, M.D., was the medical officer in charge of the employees, and his report to me thereon follows, viz.:

REGINA, October 31, 1903.

Dear Sir,—As I have been the medical officer in charge of the employees on the Arcola-Regina extension of the Canadian Pacific Railway, I beg to make the following report:

There have been working on the works since May of this year about 300 men, who have been living in tents.

The sanitary condition of each camp has been good, there being no infectious diseases except in the case of one camp, where three cases of mumps developed. These cases I had properly isolated from the camps in which they occurred, and there were no further cases developed.

I consider the health of the men on this work has been first class, there being no serious cases of illness of any kind during the summer.

I am, dear sir,

Yours truly,

J. A. GRAHAM, M.D.

Swift Current Section—(Grading, bridging, &c., 60 miles).—This work was under contract to Messrs. Foley Bros., Larson & Company, with chief quarters at Morse, N.W.T. About 300 men were employed thereon.

The health of the men was exceptionally good, and no sickness has occurred of any account. There were nine camps or more, the men being housed in tents and boarded by the contractors. Hospital accommodation was provided on the line, and water closets for each camp.

F. J. Ewing, M.D., was the medical officer in charge, and his report for the season follows :—

MORSE, N.W.T., October 27, 1903.

Dear Sir,—Permit me to report to you the sanitary condition of the Swift Current section of the Canadian Pacific Railway work.

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About 300 men employed. Twelve camps established. Sleeping accommodation ample in each camp, each man having his own bed and bedding, which is washed or aired each week. Water closets in each camp, which are properly looked after.

Surroundings of each camp kept clean, and all waste products either buried or burned.

Food, plain, wholesome, and ample in amount.

Proper and sufficient hospital accommodation located on the line, with male nurses. Medical officer visits each camp once a week. No sickness has occurred on the line, excepting a few slight colds.

I am, respectfully yours,

F. J. EWING, M.D.

Medicine Hat Section.—This work was also under contract to Messrs. Foley Bros., Larson & Company. Few men were employed, but the conditions were similar to those on the Swift Current section. No medical officer was necessary, but nevertheless Dr. Ewing was occasionally supervising the works.

Revelstoke Section—(12 miles west, near Clanwilliam).—This work was for the deviation of the main line, and was under contract to J. W. Stewart. Only a small body of men were employed. All health and sanitary conditions favourable. No regular medical officer was necessary.

Canadian Northern Railway.—This company has had under construction during the past year fourteen extensions to their lines in Manitoba and the North-west Territories. Having visited and inspected each of the said works, I have to report that I found the regulations under the Public Works (Health) Act, 1899, being carefully carried out, the hospital accommodation being fully up to the requirements, the men being supplied with ample plain, wholesome food, and well housed, the quarters and various camps being kept in good sanitary condition, and the various works, when necessary, having careful medical supervision by a duly qualified physician, each of whom was either under the charge of R. Mackenzie, M.D., or C. A. Mackenzie, M.D., both of Winnipeg, as the contractors chief medical officers, both of whom gave me every assistance towards my making the necessary inspections.

There were no contagious diseases at any of the camps, and the general health and condition of the employees were all that could be desired.

The extent of these various works and the reports received from the several medical officers in charge thereof will be found below under my description of each of the said works, viz.:—

Erwood Extension—(Completion of grade and building of track between Erwood and Melfort, 85 miles).—This work was being done by Neil Keith, contractor. Four to five hundred men were employed thereon. W. K. Hall, M.D., was the medical officer in charge of the men, and his report for the past season is as under, viz.:

ERWOOD, N.W.T., October 18, 1903.

Dear Sir,—I beg leave to submit the following medical report for this season on the Erwood extension of the C.N.R.

The sanitary and health conditions have been excellent, there being no infectious diseases or grave cases which required hospital treatment.

The greater proportion of the men lived in houses constructed by themselves, and holding from two to five persons.

There were several camps averaging about 75 men. These camps were changed from place to place about every six weeks. The men were strung along a line not exceeding twenty miles.

I visited the men on an average of every ten days.

The maximum number of men on the work was 490, and the minimum 220.

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I have one large hospital tent on hand (capacity of holding twenty patients), but never used it, as I had no need for doing so.

I am, dear sir,

Yours truly,

W. K. HALL, M.D.

Grandview Extension—(Grandview section).—This work was under contract to G. Strenel. About 350 men were employed. G. Bottomley, of Grandview, was the medical officer in charge, and his report for the past summer's work is as follows, viz.:

GRANDVIEW, Man., October 31, 1903.

Dear Sir,—I now beg to give you a short summary of the work among the men who have been under my charge during the summer.

I am happy to say that the health of all the men has been remarkably good. No cases of any infectious or contagious disease have broken out. There have been two cases of erysipelas, both of which were sent to the Dauphin hospital. Any other cases of sickness have been of a mild nature, such as bronchitis and rheumatism, and have not needed hospital treatment.

Among the accidents, there have been one case of Potts' fracture which was sent to the St. Boniface hospital, and one case of blood poisoning from a nail in hand, which was sent to the Dauphin hospital, the patient recovering with the loss of one finger. A couple of cases of fractured ribs were treated in camp, and several cases of cuts on the feet and legs from adzes used by the bridge carpenters, but none of these proved serious.

Hoping the above statement will meet with the requirements,

I am, yours very truly,

G. BOTTOMLEY.

Spirits Creek Section—(End of Grandview section to Spirits Creek). This work was under contract to G. Strenel. About 400 men were employed. There had been no contagious disease, and the health of the men was excellent.

L. J. Farrell, M.D., was the medical officer in charge. No report has been received from him, but the requirements of the (Health) Act regulations were well carried out as to sanitary matters and hospital accommodation.

Saskatoon Section—(Spirits Creek to Saskatoon).—This work was under contract by Mackenzie, Mann & Co. A large body of men were employed, who were well housed in tents, well fed, and had all necessary hospital accommodation. There had been no outbreak of contagious disease, and the health of the men had been generally good.

Dr. Harvey was the medical officer in charge, but no report from him has come to hand.

Clark's Crossing Section—(From Clark's Crossing to 50 miles east).—This work was under contract to J. D. McArthur. About 300 men were employed, and health regulations were well carried out. Dr. Mitchell was the medical officer in charge, and his report thereon for the season is as under, viz.:

CLARK'S CROSSING, Sask., OSLER P.O., N.W.T., October 31, 1903.

Dear Sir,—I beg to submit the following report on the health conditions prevailing during the six months beginning May 1, ending October 31, 1903, on the construction of Grandview extension of Canadian Northern Railway, 50 miles east of Clark's Crossing of the S. Saskatchewan river, of the medical supervisor of which I have had charge.

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I have my headquarters here, and have a large tent suitable for hospital purposes, also a smaller one in case of infectious patients.

The grading extends from here 50 miles, and this ground I cover once weekly, calling on the different camps, supervising sanitation, &c.

There have been from 200 to 300 men on an average employed, embracing many nationalities. The sanitary arrangements have been fairly good.

The water supply derived here from the river and from wells on the grade has been very good, and has had no apparent injurious effect, although alkaline in places. Pits have been dug at the different camps for refuse, and everything about kept as clean as possible.

There have been very few complaints as to food, and as far as I can see there would be no occasion for any.

There had been no infectious diseases, or serious accidents, and the health of the men was generally good.

Any further information will be gladly furnished.

Yours truly,

J. MITCHELL, M.B., Tor.,

Physician in charge of work.

Neepawa Extension—(From south of Neepawa to Carberry, 20 miles). Messrs. Mackenzie, Mann & Co. were the contractors for this work. Only a small body of men were employed thereon. The health of the employees was generally good, the sanitary regulations well looked after, and there were no cases of contagious disease. A resident medical officer was not necessary, but Dr. Leech had casual supervision.

Portage Extension—(West from Portage la Prairie to Carberry). About 150 to 200 men were employed on this work. Dr. Ponton was the medical officer in charge, under C. A. Mackenzie, M.D., as chief, and a report of the latter thereon will be found following the description of the Hudson Bay branch.

Greenway Extension—(From Greenway to Wakopa, 45 miles) About 250 men were employed thereon. At the time of my inspection Dr. Stephen Hepworth was in charge as medical officer, under C. A. Mackenzie, M.D., and the latter's report thereon will be found following the next construction work reported.

Hudson's Bay Branch—(Winnipeg to Oak Point, about 17 miles). Only a small body of men were employed thereon. Messrs. Mackenzie, Mann & Co. were the contractors for this branch, and the two previous mentioned extensions.

C. A. Mackenzie, M.D., had this branch under his personal supervision, and his report thereon, together with those of the Greenway and Portage extensions, follows as under, viz.:

WINNIPEG, Man., October 28, 1903.

Dear Sir,—I herewith beg to submit to you report to date on the several branches of the Canadian Northern Railway under my medical supervision.

Portage Extension.—This line runs west from Portage la Prairie towards Carberry. About 35 miles is constructed to date. The number of men working on the extension during the season averaged about 175, one-half English speaking and one-half Galicians.

The health of the men has been very good, only six cases of sickness being treated, one cystitis, three influenza and two rheumatism. These cases were treated in the Portage la Prairie General Hospital.

In all the different camps the hygienic conditions were very carefully looked after. Dr. Ponton had charge of this work.

Greenway Extension.—This branch runs from Greenway to Wakopa, a distance of about 45 miles. The number of men working during the season averaged about

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200. The health of the men has been exceptionally good, the only case of illness being that of the doctor in charge, Dr. Hepworth, who died from typhoid fever.

Two trivial accidents occurred during the summer. These were two cases of bruised hands, one of which necessitated an amputation of one of the fingers, which operation was successfully performed.

For hospital accommodation a tent with a capacity for eight single beds was provided, but owing to the good health of the men this was not used to any extent. After Dr. Hepworth's death, Dr. Ponton had charge of the work.

Hudson's Bay Branch.—This line runs from Winnipeg to Oak Point. It was started last year, and the remainder, a distance of fifteen miles, was completed this year.

There was only one case of sickness on this work, that being a case of appendicitis that was successfully operated on.

The sanitary conditions of all the camps were good.

This branch was under my own supervision.

Hoping this will be satisfactory,

I remain, your obedient servant,

C. A. MACKENZIE.

Rosburn Branch—(From end of extension to Rosburn, 60 miles). This work was being carried on by Messrs. Mackenzie, Mann & Co. About 300 men were employed thereon. Thos. Leech, M.D., was the chief medical officer in charge, and his report thereon is as follows, viz.:

NEEPAWA, October, 30, 1903.

Dear Sir,—I hereby beg leave to submit to you the following health report of the Canadian Northern Railway extension on the Rosburn branch, which employed about 300 men.

A resident physician was placed on the work, with headquarters at one of the central camps, who visited each of the other camps every week, attended to the medical wants of the men, and looked well after the sanitary condition of the camps.

No contagious or epidemic disease invaded the camps during the season.

Hospital accommodation was furnished for the men at the Shoal Lake Victorian Hospital, six miles distant, where two typhoid and several minor accident cases were treated at the expense of the Canadian Northern Railway medical department.

Yours truly,

THOS. LEECH, M.D.,

Medical Superintendent.

Emerson Section—(Grading, &c., east).—This work was being carried on by Wm. Robinson. Only a small number of men were employed, all of whom were in excellent health, and the sanitary regulations well looked after. There was no regular medical officer in charge.

Strathcona Section—(From Strathcona to Edmonton).—This work was being done under Messrs. Mackenzie, Mann & Co. Only a small body of men were employed thereon, all being in the best of health.

No regular medical officer had supervision of the work, all the medical services and hospital requirements necessary being obtainable at Edmonton with the utmost despatch.

Edmonton Work—(Building station and grading). Messrs. Mackenzie, Mann & Co. had this work in charge. Only a small body of men were employed, and the health conditions were excellent. Medical and hospital requirements close at hand.

Lloydminster Section—(Between Saskatoon and Edmonton). This section is being constructed through what is known as the 'Barr Colony.' The work is under contract to Messrs. Still & Gay.

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The camp was not a large one, only a comparatively small body of men being employed at the time of my visit. The health of the men was good, and careful sanitary arrangements were being arranged for. The camp was entirely one of tents, and all necessary tents for hospital use were provided. As the work had only just been started at the time of my inspection no resident medical officer had been appointed, but that was being arranged for, and one has since been appointed, but probably owing to the difficulty and delay of communication no report from the said physician has reached me as yet.

St. Mary's River Railway.—This company under lease or ownership by the Alberta Railway and Coal Company was constructing a line from Spring Coulee to Cardston.

Only a small body of men were employed. The health of all was good, most of the men living at their own homes along the line.

Splendid hospital accommodation was at hand at Lethbridge, with telephone communication.

No regular medical officer was employed by the contractor, but N. H. Mewburn, M.D., had general supervision on behalf of the Alberta Railway and Coal Company, and his report on the said construction follows, viz.:

LETHBRIDGE, October 31, 1903.

Dear Sir,—The construction work on the St. Mary's River R.R. has been going on for nearly four (4) months. Grading has been done by a contractor with labour mostly supplied by farmers living along the line of work. I have no medical arrangements with the contractor.

Up to the 11th of last month the St. Mary's River R.R. had a gang of not more than twenty-five men working; since then this has been gradually increased to fifty or sixty. This will be reduced in two weeks or more, depending upon weather, to fifteen or twenty, who will go into winter quarters on the St. Mary's river. At no time has the force employed by the St. Mary's River R.R. exceeded seventy-five men. The men live in camps (tents) and warding cars, which are clean and in good condition.

There has up to this date been no sickness.

There is a daily train service between the camps and Lethbridge, as well as telephone connection, so that the sick can come in, or doctor go out, as necessary. At Lethbridge there is a well equipped hospital, used by the company for its employees (the Galt Hospital). There are extra tents on hand to be used for isolation purposes if required.

Yours truly,

R. H. MEWBURN.

Vancouver, Westminster and Yukon Railway—(Construction work near New Westminster, B.C.). I found the work on this line at a standstill, owing to an injunction having been granted, and no large body of men were being housed or boarded by the company or contractors.

Prince Edward Island Railway—Murray Harbour Branch—(Charlottetown to Murray Harbour). This branch is being built by the Dominion Government. Mr. Willard Kitchen is the contractor, with his headquarters at Murray River, P.E.I.

The health and sanitary conditions of the men have been well looked after, and there has never been any contagious disease.

Dr. Lester Brehaut, of Murray River, has had general supervision over the employees, and his report thereon follows, viz.:

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MURRAY RIVER, P.E.I., October 27, 1903.

Dear Sir,—The men employed by Mr. Willard Kitchen are accommodated in houses of good sanitary condition. During the season there have been no deaths, and practically no disease of any kind. Contagious diseases there have been none.

Accidents have been few and minor in nature. Good accommodation for sick men is easily available from any part of the road a-building.

Yours truly,

LESTER BREHAUT, M.D.

Cape Breton Railway—(From Port Hawkesbury, C.B., to Sydney, C.B.). The headquarters camp had been removed since last year from Port Hawkesbury to St. Peters, C.B., and the road was in operation between those points, but at the time of my visit to the latter place all construction work had been discontinued. P. A. MacDonald, of Port Hawkesbury, had been the medical officer in charge during construction.

Halifax and South-western Railway—(New Germany and Caledonia Branch).—The contract for the construction of this branch is in the hands of Mackenzie, Mann & Co. About 125 men were employed thereon, and their health was excellent.

There had been one case of typhoid fever, and the patient was well nursed and attended to and made recovery. The medical supervision of the men was in charge of W. H. Cole, M.D., whose report thereon follows, viz.:

CALEDONIA, QUEEN'S CO., N.S., October 26, 1903. .

Dear Sir,—In reporting to you for the past year *re* the health of the employees on the Caledonia branch of the Halifax and South-western Railway, I have to say that there has only been one case during the year of contagious or infectious disease, and that was a mild case of typhoid fever in August last which came under the care of my assistant, Dr. J. C. Feindel, of New Germany, N.S. The patient (an Italian) was well cared for (hospital and nurse being provided at our expense), and made a good recovery.

The health of the men in general has been exceptionally good.

We have only had one accident worthy of note during the year, and that occurred a few days ago. One of the brakemen on the construction train lost a thumb by getting it crushed while in the act of coupling cars. He is doing well and will soon be able to resume work.

The number of men employed has averaged from 70 to 180.

The branch is about completed. A regular train service will probably be established within another month.

Your obedient servant,

W. H. COLE,

Medical Officer.

Cal. Br. H. & S. W. Ry.—Liverpool Section—(Between Queen's County line and Liverpool River). The contractors for this section were The Atlantic Contracting Co. About 300 men were employed thereon.

The health of the men was excellent, there having virtually been no sickness and no accidents. Hospital accommodation (tents) was provided. F. P. Smith, M.D., was the medical officer in charge, and his report thereon is as follows, viz.:

MILL VILLAGE, N.S., October 30, 1903.

Dear Sir,—I beg to give you a report of labourers on the Halifax and South-western Railway construction between Queen's county line and Liverpool river.

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Maskey & Moroson have graded about 2 miles of road, and another mile under construction, which is between the county line and Portmedway river. They have about 100 men employed. There has been no sickness among them, except slight colds and coughs, but nothing to confine them to camp. There have not been any accidents whatever.

Mr. Caselins has about 200 men employed, and has about 2 miles graded, and another under construction. There has been no sickness among them except colds, &c., and no accidents whatever.

The camps are on good high dry ground, and comparatively clean and healthy.

The contractors are very ready and willing to do anything for the comfort and health of their men. They are about moving into winter quarters now, which are good comfortable houses where they can keep dry and warm.

I remain, yours very truly,

F. P. SMITH.

Bridgewater Section—(From Bridgewater to Queen's County line). The Atlantic Contracting Company are the contractors for this work. About 300 to 400 men were employed thereon. The health of the men has been good, with the exception of one case of typhoid fever. The accidents have been few and of minor importance. Tents are provided for hospital purposes.

H. A. March, M.D., was the medical officer in charge of the men on this section, and his report thereon is as under:

BRIDGEWATER, N.S., October 30, 1903.

Sir,—As medical officer in charge of men employed in the construction of the Halifax and South-western Railway, for the district extending from Bridgewater to the Queen's county line, I beg to submit the following report:

The work began about the middle of July, over a distance of fifteen miles settled country. Average number of men under my care, 350. No hospital within the county with the exception of the Marine hospital at Lunenburg town.

A large number of the men employed live within the neighbourhood of the line of railroad, however, and in case of sickness would be cared for in their own homes. If an epidemic should occur, tent hospitals could be established at any point.

Thus far there has been no serious sickness, with one exception, a case of typhoid fever. This patient was removed to a private residence, the municipal health officer notified, and precautions taken against the further spread of the disease.

One fracture of the thigh and a few minor accidents have fallen to my lot, slight attacks of diarrhoea, a few cases of dysentery, and in the later months some cases of acute bronchitis have claimed my attention.

The season has been an exceptionally favourable one for railroad construction.

I have visited the camps regularly once a week, besides visiting and rendering assistance whenever called upon to do so.

I have the honour to be, sir,

Yours obediently,

H. A. MARCH, M.D.

Hubbard's Cove Section—(Bridgewater to Mahone Bay). This work was under contract to Mr. Angus Sinclair, C.E. A considerable body of men were employed thereon. The health of the men was generally good, but there had been one death from pneumonia. Hospital tents were ready for use if necessary. Medical supervision of the employees was under the charge of Dr. Thos. Verner, a summary of whose report is given below, viz.:

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HUBBARD'S COVE, N.S., October 31, 1903.

Dear Sir,—In conformity with the Health Act, I beg to give you a report of the men employed on the Halifax and South-western Railway under my care up to October 31, 1903.

There were a few trifling accidents from powder, dynamite and falling rocks. There were 5 cases of pneumonia; one death therefrom. There were 15 cases of bronchitis; all recovered. The other diseases I mention were all of a minor nature, and all are better now. I have had a lot of colds, but of a trivial nature.

Yours sincerely,

THOS. VERNER, M.D.

Mahone Bay Section—(Mahone Bay to Chester Basin). This work was under contract to Mr. Angus Sinclair, C.E. About 400 men were employed thereon. The health of the employees was very good, there being no contagious or infectious diseases. The sanitary conditions of the camps was being looked after, and the men were well housed. Dr. G. Ross Faulkner was the medical officer in charge of the employees, and his report thereon is as follows, viz.:

MAHONE BAY, N.S., October 31, 1903.

Report of medical officer on *Section 3, Halifax and South-western Railway*, between Mahone Bay and Chester Basin.

Number of miles in section, 12. Number of men under supervision during different months, beginning April 1, 1903, 200-440. Visited all men at work either on the work or in camps, weekly. Special visits whenever summoned, and the privilege of office treatment to all the men. Telephone communication every four miles on section.

Private houses available for patients with competent attendants all along the section. Medicines dispensed on weekly and special visits whenever asked for.

Sanitary condition of camps and boarding houses, good. Deaths among employees on section, none. Infectious diseases, none. Accidents were very rare and were of no serious import; all made good recovery, and all were well cared for during inability. Very little serious or prolonged illness, a fortnight being the longest experienced by any one. Infectious or contagious diseases fortunately did not occur, but ample provision would have been made for them had such occurred by the municipal authorities, so I had not considered it necessary to carry out that condition of the Act.

I am forwarding this report in compliance with the terms of the Act (Reg., sec. E), and I think I can safely add that the attendance has been on the whole entirely satisfactory to the employees. I had provided a substitute to attend them in the event of my absence, and endeavoured to serve the physical interests of all workmen to the best of my ability.

Yours truly,

G. ROSS FAULKNER, M.D.

Med. officer H. & S. W. Ry., Sec. 3.

Chester Section—(Chester to Halifax). This section was also under contract to Mr. Angus Sinclair, C.E. About 750 men were employed thereon. The health of the employees was generally good, there being no contagious disease, and all were well housed under sanitary conditions. Tents or buildings were always available in the event of necessity.

Drs. Hebb and Morse were the supervising medical officers, and their report is as follows, viz.:

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CHESTER, N.S., October 31, 1903.

Dear Sir,—In accordance with the Dominion Statute, dated May 13, 1903, we beg leave to make the following report of medical service on the construction of the Halifax and South-western Railway.

The number of men under our charge for medical attendance each month since November, 1902, has varied from less than 100 to about 950. The men have been free from infectious diseases of all kinds, have had but minor ailments, accidents chiefly of a minor nature. One death due to dynamite explosion (premature).

The men have been housed in comfortable quarters, generally speaking with some regard to hygienic conditions.

Respectfully submitted,

Your obedient servants,

DRS. HEBB and MORSE.

Chateauguay and Northern Railway. This is being constructed between the city of Montreal and the town of Joliette. Mr. W. J. Poupore is the contractor for the grading between Charlemagne and Joliette, and Mr. J. T. Schell the contractor for grading between the city of Montreal and Bout de l'Île. There were about 300 men employed on both sections, many of them residing in the neighbourhood, the remainder camped in tents and boarded by the contractors.

The health of the men was good, and all conditions favourable. Hospital accommodation was provided in the city of Montreal, and medical attendance within telephone call, and either could be reached by rail transported patients within an hour.

BRIDGES.

There are only three works of this kind being constructed at present, as far as I have been made aware, that come under the application of the Public Works (Health) Act, 1899, and the regulations thereunder. They are as under:—

The Chateauguay and Northern Bridge. This is being constructed from Bout de l'Île to Charlemagne. Mr. W. J. Poupore is the contractor therefor. About 100 men were employed thereon most of whom lived or boarded in the surrounding neighbourhood or in the city of Montreal. The health of the men and surroundings was generally good. No medical officers were specially in charge, they and necessary hospital accommodation being easily obtained in the city of Montreal.

The Quebec Bridge. This is under construction from the city of Quebec to Point Levis. The men employed board and lodge with surrounding families, or live in their homes. The health of employees has been good, and no contagious disease has broken out. Hospital accommodation and medical attendance are provided for in the city of Quebec.

The Hillsborough Bridge. This is being built from Charlottetown, P.E.I., and is to form the connection for the Murray Harbour branch of the Prince Edward Island Railway. Mr. M. J. Heney is the contractor from and under the supervision of the Dominion Government.

A considerable body of men were employed thereon, who were being well looked after as to board, lodgings and sanitary conditions. The health of the men has been generally good, and no contagious diseases have developed among them. P. Conroy, M.D., is the medical officer supervising the employees, and a report from him thereon to date is as follows, viz.:

CHARLOTTETOWN, P.E.I., October 31, 1903.

Sir,—I beg leave to submit my report as to the condition of the men employed in the Hillsborough bridge construction, for the year ending October 31, 1903.

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I may say that every provision is made by the contractor for the proper care and treatment of the men employed on this work. Although the sinking of deep caissons under heavy atmospheric pressure is attended with extreme danger to life, there has as yet been only one death from that cause. There have been several severe cases of caisson disease, but excepting in one case all ended in recovery.

No epidemic has occurred among the men, and the accidents were all of a minor nature. Ample accommodation is made at the hospital here for all cases of sickness or injury.

The number of men employed varied between 300 and 400.

I am, sir,

Your obedient servant,

P. CONROY, M.D.

OTHER PUBLIC WORKS.

High Level Pier—(Montreal Harbour). This work was under contract to Malone & Poupore. A considerable body of men were employed, but they lived at their own homes or boarded and lodged in the surrounding neighbourhood. All hospital requirements and medical attendance when necessary are provided at Montreal.

Dock and Ice Breakers—(City of Three Rivers).—This work is being constructed by the Dominion Government, and is under contract to Mr. Randolph Macdonald.

About 75 to 100 men were employed thereat. About two-thirds of the men employed live in their own homes, and the remainder are well looked after by the contractor. The men were in the best of health, and no serious disease had broken out. There is no regular medical supervisor, and the General Hospital at Three Rivers would be used if necessary.

Wharf at Grand Vallée—(Gaspé County, Que.).—This work is being constructed by the Dominion Government, and is under contract to Mr. Henry Smith. Owing to the small number of men employed, and these living in their own homes, the work does not come under the application of the Public Works (Health) Act 1899, but some complaints having been made, and it being reported to me that an epidemic of typhoid fever had broken out at said works, I communicated with the contractor as to the facts, and beg to submit his report thereon as under, viz.:

GRAND VALLEE, QUE., October 28, 1903.

Dear Sir,—Your favour of the 16th received, and in reply, we were not aware of the Act which you have the kindness to send.

The parties are mistaken, as the few cases of typhoid fever were at Little Valley, distance about 6 miles from here, and the authorities had the places isolated, and we have not heard anything of more cases since August. We have been working here for the last two summers, but never employed more than 30 men at one time and now have only 20 men at work. We are not running any camp or boarding establishment; most of the men are residents of the place, and live at home, and the remainder are boarding in private houses:

I have the honour to remain,

Yours truly,

HENRY SMITH.

Breakwater—(Depot Harbour, Ont.).—This work is being carried on by the Dominion Government, and is under contract to Messrs. Davis, Haney & Miller.

About 75 to 100 men were employed thereon. The health of the employees was good, the sleeping and dining quarters clean and airy, and the food good, substantial and well cooked, the camp being in a high and dry location.

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C. O'Gorman, M.D., was the medical officer who had charge of the employees and supervision of the camps, and his report thereon follows, viz.:

DEPOT HARBOUR, October 20, 1903.

Dear Sir,—Concerning the camps (breakwater) conducted by Messrs. Davis, Haney & Miller, contractors. I beg leave to state that as a camp it fully comes up to the requirements of the Public Health Act.

The sleeping arrangements are all that can be desired, well ventilated and cleanly kept. The dining rooms for the men and clerks are scrupulously clean, the food well cooked, and everything, owing to Mr. Moffat, the caterer's supervision, is done for the wants and comfort of the men.

The buildings are situated, as you are aware, in a most healthy locality, on a high rocky point, no stagnant water around, and the drinking water obtained from the Georgian Bay.

There has been little or no sickness among the men, beyond slight ailments. The average number of men at this camp is about 60, and at the Quarry camp, about 6 miles across the water. 20 to 25 men are engaged, and have good clean quarters to eat and sleep in.

It is my opinion that the contractors look after their men well as regards board and lodging, thereby fulfilling all requirements of the Public Works (Health) Act.

Only two accidents have occurred during the season.

I remain, dear sir,

Yours truly,

CONSTANTINE O'GORMAN, *M.D.*

In closing this, my annual report for the past twelve months, it is a great pleasure to be able to draw your attention to the apparently steady improvement from year to year in the general healthfulness and condition of all employees on public works, which, together with the fact that there was virtually no outbreak of contagious disease on the said works during the past season, is in my humble opinion somewhat of a fair proof that the passing of the Act 62-63 Vic., Chap. 30, intituled

'An Act for the preservation of health on public works,' was a beneficial piece of legislation, not only to contractors and others carrying on such works, but to the thousands of labouring men employed on the many various public works throughout the Dominion.

I have the honour to be, sir,

Your obedient servant,

CHAS. A. L. FISHER,

Inspector.

The Honourable

The Minister of Agriculture,

Ottawa.

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HEALTH OF ANIMALS.

No. 15.

REPORT OF J. G. RUTHERFORD, V.S., CHIEF VETERINARY INSPECTOR.

OTTAWA, October 31, 1903.

SIR,—I have the honour to present my annual report as Chief Veterinary Inspector for the Dominion.

During the year just passed my time has been very fully occupied, as in addition to carrying on the ordinary executive work of the branch I have found it necessary to devote considerable attention to the reorganization of some of its features, and have also, owing to unavoidable circumstances detailed elsewhere, been compelled to undertake a good many rapid journeys to different parts of the Dominion.

The rapid development which has characterized all branches of Canadian industry during recent years has very noticeably affected the live stock interests of the country.

The marvellous increase in the numbers and value of our flocks and herds has added in a corresponding degree to the duties and responsibilities of this branch of your department, to which is entrusted the important duty of guarding against those contagious diseases which threaten the prosperity of owners of live stock.

The field is a wide one, and while I hope to be able to show you that some progress has been made in the organization and systematization of our work, I must also endeavour to impress upon you the need for further development of the machinery required for the successful control and eradication of those maladies which endanger one of the greatest sources of our national wealth.

It is easy to underestimate the importance of such a branch of the public service as that under my supervision, for the reason that so long as its work is fairly well done it attracts, in the very nature of things, but little attention. It is only when some destructive disease has obtained a foothold among the live stock of a country that the public realizes to what an extent it is dependent upon the organization controlling such matters. Fortunately for all concerned, the year just passed has not been noted for any very serious or wide-spread outbreak of disease in the Dominion, although it looked at one time as if we were about to be visited by one of the worst bovine scourges of modern times, namely, Foot and Mouth disease. I think it may be reasonably claimed that the prompt and thorough measures adopted by this branch of your department were, to a great extent, effective in warding off the threatened danger. This subject is specially dealt with on page 167.

In the work of organization above referred to, the following steps have been taken during the year:—

The Biological Laboratory erected last year at the Experimental Farm has been completed and equipped under the personal supervision of Dr. C. H. Higgins, your pathologist. This establishment is now in working order, at least to such an extent as is possible without stabling and other accommodations suitable for experimental work on the ordinary domestic animals. Owing to the lack of facilities mentioned, it is necessary at present to use only the smaller animals as subjects for experiment.

Much valuable work is now done at this laboratory, not only in scientific research but also in the examination of pathological specimens sent in by our officers

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and others throughout the country. In this way it is often possible to decide definitely and promptly as to the nature of outbreaks which cannot readily be diagnosed by ordinary methods.

Some progress has been made in the manufacture of mallein and tuberculin, and this work is likely to be profitably extended in the near future, as it is my intention, with your approval, to arrange with Dr. Salmon, Chief of the Bureau of Animal Industry, to allow Dr. Higgins an opportunity of familiarizing himself with the methods pursued in the laboratories at Washington, where large quantities of the preparations alluded to, as well as of the various prophylactic vaccines, are now manufactured for distribution among the farmers of the United States. With the experience thus gained, Dr. Higgins will be in a position to carry on a similar work here, at an expense but slightly exceeding that now involved in the maintenance of the laboratory, while the greatly reduced cost at which these various preparations, now largely used, can then be supplied to stock owners, will far more than balance the increased outlay.

Dr. Higgins has furnished a very interesting and valuable report of his work, which will be found at page 93.

The experience gained during last summer convinced me that the Animal Contagious Diseases Act was somewhat unwieldy and out of date, and that it might with advantage be simplified and rendered more workable. I therefore, with your approval, drafted a new bill, in which a considerable number of changes were embodied. Many of these amendments, though apparently slight in themselves, are very important from an executive point of view, and will, I think, be found of great assistance in the work of the branch. The Bill was introduced early in the session, and after full discussion and amendment in both Houses of Parliament it received the Royal assent, and became law on August 13. New regulations in conformity with its provisions are in course of preparation and will shortly be issued. Meanwhile those passed in 1897 under the authority of the measure now repealed, continue in force.

The work performed by the regular inspectors of the branch, has been, with few exceptions, of a very satisfactory nature.

At headquarters I have received most valuable assistance from Dr. Moore, who has done a great deal of travelling, and who can always be relied on to execute the often difficult duties assigned to him in an efficient and tactful manner.

During the year several other officers spent short periods at head office and in the laboratory.

Among these may be mentioned Dr. Hopkins, who, during the season of 1902, performed the duties of veterinary quarantine officer in Britain. Owing to the change effected last winter in the method of testing imported cattle his services were no longer required in that capacity, and he was for some six months on the regular staff, with headquarters here. In May last he was transferred to Vancouver, B.C., and placed in general charge of the work of the branch in that province. Since his arrival there he has succeeded in systematizing the methods of stock inspection and generally improving the tone of our work on the coast.

Dr. Perdue, of Kingsville, who, as may be remembered, was some years ago, instrumental in stamping out hog cholera in Essex, has been transferred to Chatham, where he has been given full charge of the work of dealing with the serious outbreak of that disease in Kent county. A number of our other officers, among whom may be specially mentioned Dr. Orchard of Windsor, have also been employed in this field. While the disease still prevails to a considerable extent in the country immediately surrounding Chatham, I am satisfied that the businesslike, official methods introduced by Dr. Perdue are having an excellent effect, and will in the near future result in its complete eradication from the district.

Dr. Pethick, who has for a number of years been in charge of the work of this branch in Prince Edward Island, has been transferred to Antigonish, N.S., where,

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in addition to other duties, he is superintending the experiments now being carried on there with a view to discovering the cause of Pictou cattle disease. His selection for this task is due to his commendable zeal in endeavouring to collect information regarding this peculiar disease, which has hitherto baffled all efforts to determine its true nature.

The number of animals passing through the Toronto cattle market and the Union stock yards at Toronto Junction is now very large, and in view of the possibility of disease spreading in this way, Dr. Stork, one of our officers, has during the last year been in attendance each market day, armed with authority to take action in the event of any animals showing suspicious symptoms being presented for sale. This officer reports regularly to the department, furnishing a statement of the numbers of animals passing through the market, together with any other details which he deems it advisable to mention. It is, of course, distinctly understood that it is no part of his duty to carry out the provisions of the Ontario Public Health Act, the administration of which is in the hands of the provincial authorities.

For some years past the work of this branch in the North-west Territories has been performed in a most satisfactory manner by the veterinary officers of the North-west Mounted Police, supplemented by one regular inspector, Dr. Hargrave, of Medicine Hat. Owing to the large influx of settlers and the greater demands made on the services of the police, it has been found necessary to inaugurate a new arrangement. Under the plan now adopted, the police force maintains one inspector and eight veterinary staff sergeants, whose services are, as heretofore, at the disposal of this department, while for each additional veterinary staff sergeant employed, an allowance of \$2 per day is made to the force from the funds at the disposal of this branch. There are now six of these extra officers on the strength, and the Commissioner considers that this number will prove sufficient for some time to come. The annual allowance paid by this branch to each of these fourteen officers has been increased to \$200, while small grants are also made to the Commissioner, the Assistant Commissioner and Inspector Burnett, the chief veterinary officer of the force. Owing to the excellent system under which the work is carried on by these officers, and their facilities as regards transportation, to say nothing of their knowledge of the country and its conditions, the work of controlling contagious diseases of animals is performed much more economically and effectively than would be possible under any other arrangement.

I may add that the system has been extended to Yukon Territory, one of the veterinary staff sergeants mentioned above being now stationed at Dawson City, where, unfortunately, an outbreak of glanders took place last winter.

Since the opening of the Yukon Territory a large number of cattle and sheep for slaughter have been, each season, shipped to that district from Vancouver via Skagway. These animals, owing to the fact that they were carried on vessels clearing for a foreign port, were, I found, being treated as export stock; that is to say, they were being inspected before shipment. This I considered a needless burden on a trade already too expensive, especially as a further irregularity existed in the charging of fees for such inspections. I therefore took the matter up with the United States authorities, who, after some correspondence, granted my request that Canadian live cattle should be allowed to pass in bond, without inspection or the production of health certificates, over the strip of American territory lying between Skagway and the international boundary.

This is no more than reasonable, the shipments being really made from one part of the Dominion to another, although, unfortunately, compelled by circumstances to be landed at a foreign seaport.

The detail work inseparable from the reorganization of this branch, a task, as may be easily seen, yet far from complete, has, during the year, largely occupied my attention. In addition to the legislation previously referred to, many new forms

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for the use of inspectors have been prepared and distributed. The changed regulations have also necessitated an extensive correspondence, which has made heavy demands on my time. For these reasons I have not found it possible to travel as much as I otherwise would have done. I have, however, endeavoured to visit all points where local matters demanded my personal attention.

I hope in the future to be able to arrange matters as to give me greater freedom to visit the various districts where our officers are located, and thus to keep in closer personal touch with the actual conditions under which their work is performed than has hitherto been practicable.

I now beg to offer brief statements in detail of the work done by the branch in connection with the various diseases dealt with during the year.

HOG CHOLERA.

Hog cholera has, I regret to say, continued to prevail to a somewhat serious extent in the county of Kent, Ontario, and to a less degree in the adjoining counties of Essex and Lambton. Minor outbreaks have also occurred in other parts of the Dominion, but these were, in most cases, directly traceable to hogs shipped from those portions of the district above mentioned, which it had not been deemed absolutely necessary to place under close quarantine. It is found, however, that such isolated outbreaks are comparatively easy to deal with, and that by the immediate adoption of stringent measures the disease can usually be stamped out without serious loss. Our experience in the infected area above mentioned has been of a less encouraging nature, and the outbreak mentioned in my last report as affecting a considerable portion of Kent still persists, though to a less serious extent.

As stated in my report of last year, an order was issued on October 22, 1902, forbidding entirely the movement of live hogs into, within or out of an area comprising the townships of Tilbury East, Raleigh, Dover East and West, Chatham, Harwich and Camden. As only a few outbreaks had occurred in Camden, I decided to make a farm to farm inspection of the hogs in that township as soon as the setting in of winter had checked the disease and set our inspectors at liberty for the work. A careful investigation having failed to bring to light any cases of the disease, an order was issued on November 29, 1902, releasing Camden from the restrictions above referred to. I am pleased to say that this action has been justified by the results, one small outbreak only having occurred in this township during the present season.

The restrictions against the shipment of live hogs from the other townships mentioned were maintained until April 3 of this year, when owing to the advent of warm weather it became impracticable to ship dressed pork.

A new order was therefore issued permitting the shipment from a number of specified points within the quarantined area of live hogs consigned direct to packing houses and slaughter houses. Each shipment had to be accompanied by a certificate from one of our regular inspectors, stating that the hogs composing it were free from disease and in every way fit for immediate slaughter.

The latter provision was inserted to prevent the shipment of small and light hogs, which under ordinary conditions of the trade are not accepted by the packers, and, being resold to farmers, are frequently instrumental in causing outbreaks of disease. The order also provided for the cleansing and disinfection of all cars used in the conveyance of hogs from the quarantined area after being unloaded and before being again used for the conveyance of animals or other articles.

Considerable difficulty was experienced in inducing some of the railway companies to carry out that part of the order relating to the cleansing and disinfection of cars. By having a duplicate copy of each certificate sent in promptly by the inspector, I was enabled to check up most of the cars and insist on their being properly dealt with. I may say that as the season advanced and the railway companies became

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convinced that the department intended to insist on their complying with the order, the difficulty experienced in getting the cars cleaned became greatly less. Much correspondence and many official inspections were necessary before this condition was brought about, and even yet the methods of the companies are capable of great improvement.

In all other respects the order of April 3 was strictly carried out, with the result that there was a marked diminution in the number of outbreaks of hog cholera in other parts of the country. This improvement was especially noticeable in the districts immediately tributary to the large pork packing establishments, from which formerly a number of hogs, rejected as being too light for slaughter, were distributed among farmers for feeding purposes.

One serious outbreak of hog cholera, however, occurred in the counties of Huron and Bruce early last summer. In this case the disease was traced to a carload of hogs shipped from Belle River in the county of Essex. This district was not in quarantine, and none of our officers were aware of the existence of hog cholera there. Inquiry, however, elicited the information that an outbreak of the disease involving several farms had taken place in the early spring. The facts had not been reported, with the result that the hogs purchased in the neighbourhood conveyed the infection to Huron and Bruce, and as above stated, caused the disastrous outbreak there. This incident is illustrative of the difficulties encountered in dealing with contagious diseases of animals, and shows how the best efforts of the authorities may at times be thwarted by the ignorance or cupidity of owners. Apart from this case, no really serious outbreak has taken place, although the disease has from time to time made its appearance in different localities.

On the whole, the method adopted, as above outlined, for regulating and controlling the shipment of live hogs from infected areas, appears to be productive of satisfactory results.

In the quarantined district itself the disease began to make its appearance more frequently as the summer drew to a close, and as a considerable number of outbreaks were reported during September and October, I deemed it advisable to again stop the movement of live hogs. An order to that effect was therefore issued on October 26, and will come into force on November 1. Every endeavour has been made to render the work of our inspectors dealing with the disease in the quarantined area as thorough and effective as possible, and I may say that a much better spirit appears to prevail among those interested in the hog industry than was the case when we began active operations among them.

It is my intention, with your approval, to keep the infected area under close restrictions, and to deal in the same way with any portions of the adjoining territory in which the disease becomes so prevalent as to render the movement of hogs therefrom a source of danger to the rest of the country. I am convinced that by dealing with the matter on strictly business principles, and insisting on the systematic carrying out of all orders issued by this department, either to its own officers or to the public, the disease can eventually be eradicated, provided fresh infection is not introduced.

I regret to say that many farmers seem inclined to conceal the existence of the disease, and to treat their sick hogs with one or other of the so-called hog cholera cures which are largely advertised by American empirics. Some encouragement is afforded to this line of conduct by the fact that the disease has varying degrees of virulence, and that hogs not unfrequently appear to recover from even comparatively severe attacks. This fact is taken advantage of by the vendors of these so-called remedies, and the farmer is told that he can cure his hogs instead of having them slaughtered, as will be the case if he reports to the proper authorities. As a rule, the farmer who adopts this method of dealing with the disease becomes a heavy loser, and eventually reports to our inspectors, but by that time much mischief has resulted

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from the disease being allowed to go on unchecked, perhaps for a considerable time. It has never been contended by any authority that hog cholera is an invariably fatal disease, but, on the other hand, it is well known that one of the most frequent causes of its spread is the transfer of one or more of these so-called 'cured' hogs from one district to another. So far as is at present known, the only safe mode of dealing with hog cholera is to slaughter all the animals in the infected herd, whether they show any signs of disease or not.

Having in mind the possibility of the introduction of fresh infection by transit hogs passing through Canada from the western states to Buffalo and other eastern points, I have paid during the past season a good deal of attention to the cleansing and disinfection of cars entering Canada at Windsor and Sarnia. Owing, however, to the peculiar conditions inseparable from this trade, it is impossible to effectually safeguard it, and it is, in my opinion, questionable whether the department would not be justified in forbidding the shipment of these American hogs through Canadian territory.

I may add that the conditions under which the hog industry is maintained in the south-western counties of Ontario are exceedingly favourable to the development and spread of the disease. The staple crop in the district referred to being corn and the climate being comparatively mild, large numbers of hogs are allowed to run at large during the greater part of the year. In this way the disease is easily spread from farm to farm by contact, with the result that whole districts have become infected. The sanitary conditions, also, under which hogs are kept, are, in most cases, exceedingly unsatisfactory, while except when performed under the supervision of our own inspectors, the work of disposing of dead animals and debris is grossly neglected. As elsewhere stated, several of our regular salaried officers have been drafted into the affected district, with instructions to devote any time which they are able to spare from the active performance of their duties of inspection to the carrying on of a campaign of education among owners and others interested in the hog industry.

The matter is one not easy to deal with in a manner satisfactory to all concerned, but, while consideration ought certainly to be shown to those suffering actual loss, we must not neglect the interests of the hog owners throughout the rest of the Dominion, and, this being the case, I would strongly recommend the maintenance of firm restrictions on the movement of hogs out of infected areas.

A peculiar outbreak of hog cholera took place during last winter, in the neighbourhood of Grand Pabos, on the Gaspé peninsula. In this case, the disease was attributed to hogs running on the fore-shore, having come in contact with the carcasses of swine evidently thrown over-board from passing steamers. While, taking all the circumstances into consideration, it is difficult to accept this theory as to the appearance of the disease in this remote district, it must be admitted that no other possible source of infection was discoverable. The disease was eradicated with comparatively trifling loss, and no recurrence has, so far, taken place.

Isolated outbreaks also occurred at Montreal, Que., Three Rivers, Que., Greenwood, B.C., and Victoria, B.C., but in these cases few animals were affected, and no difficulty was experienced in stamping out the disease.

An interim report issued only last month by Drs. De Schweinitz and Dorset, of the Bio-chemic Division of the U. S. Bureau of Animal Industry, contains the interesting statement that a form of hog cholera which prevails in south-western Iowa has been shown to be due to some unknown organism other than the bacillus generally credited with being the causative agent of the disease.

The malady in question resembles closely the acute form of hog cholera, not only in symptoms, general history and postmortem appearances, but in the facts that it is highly infectious for hogs only, and can be stamped out by the adoption of the measures successfully employed in dealing with the former affection.

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The disease is easily transmissible from one hog to another by subcutaneous inoculation with certain body fluids, the freedom of which from the presence of the bacilli of either hog cholera or swine plague has been demonstrated beyond question.

An interesting feature of the experiments consists in the fact that all the animals infected in this way develop acute hog cholera, no chronic cases whatever having resulted from the inoculation. This circumstance leads the investigators to suspect that in all outbreaks of acute hog cholera there is some other agent besides the hog cholera bacilli at work, and that in acute cases where the bacillus is present there is a mixed infection by the latter and the organisms responsible for this newly discovered form of the disease.

This view is strengthened by the fact that the investigators have succeeded in isolating virulent hog cholera bacilli from hogs in which the disease had been produced by inoculation with infective material in which the absence of the bacilli had been conclusively proved.

This preliminary report affords good ground for the hope that our American friends are on the eve of a discovery, which may be of such importance as to revolutionize present methods of combatting this troublesome disease.

The early publication of further details is promised, and will be awaited with anxiety by all those interested in the hog industry.

The following statement shows the counties, townships and districts in which hog cholera occurred during the past twelve months, as also the number of farms quarantined:—

NUMBER of Farms Quarantined for Hog Cholera, Twelve Months ended October 31, 1903.

Province.	County or District.	Township.	No. of Farms.
Ontario.	Bruce	Huron	5
"	Elgin	Dunwich	1
"	Essex	Mersey	7
"	"	Rochester	3
"	"	Sandwich East	5
"	"	Sandwich West	3
"	"	Tilbury West and North	30
"	Huron	Ashfield	1
"	Kent	Camden	1
"	"	Camden Gore	1
"	"	Chatham	37
"	"	Chatham Gore	13
"	"	Dover	60
"	"	Harwich	108
"	"	Howard	1
"	"	Raleigh	9
"	"	Romney	1
"	"	Tilbury East	23
"	Lambton	Sombra	5
"	Middlesex	Adelaide	1
"	Wellington	Eramosa	1
"	"	Garafrax	1
"	Collingwood district		2
"	Niagara		7
"	Sault Ste. Marie district		5
"	Sudbury		6
"	Toronto		7
Quebec.	Gaspé	Pabos	3
"	Three Rivers		1
"	Montreal		1
British Columbia.			6
Total			360

TUBERCULOSIS.

Recent investigations have demonstrated that a considerable period, viz., from eight to fifty days, elapses between the date of infection with tuberculosis and the time when it is possible to obtain a reaction to the tuberculin test.

This fact, taken in conjunction with our experience, in 1901 and 1902, of the doubtful methods used to evade the test by some British breeders, led me last winter to recommend to you the discontinuance of the official testing in Europe of cattle intended for export to Canada, and the adoption instead of the plan of testing such animals after their arrival in the Canadian quarantine. With your approval therefore, and I may add with that of the executive committee of the Dominion Cattle Breeders' Association, all cattle now imported from Canada to Europe are tested after they have been sufficiently long in quarantine to settle down and become accustomed to their surroundings. The test is made under such conditions as ensure fair play to the animals and their owners, as well as to the officer entrusted with the work. Animals which react, but do not show clinical symptoms, are permanently ear-marked and listed, and may then be removed at the expiry of the usual period of quarantine without further restrictions, save that they must at no time be offered for export to the United States, so long as the regulations, at present maintained by that country, continue in force.

Canadian cattle reacting to tuberculin when tested for export or otherwise are treated in a similar manner. Some difficulty was experienced in obtaining a satisfactory permanent ear-mark, and it was only after considerable experimentation that the present instrument was evolved. The mark finally decided on is a large 'T' cut clean out of the right ear; a small notch in the margin of the same ear is also added to denote the year in which the test is made.

While this method of dealing with reacting cattle may evoke some criticism, I am satisfied that under existing conditions of knowledge and sentiment *re* bovine tuberculosis, it is the most sensible solution of the problem which confronts those charged with the task of controlling the disease.

The slaughter of a few animals now and then, simply because circumstances lead to their being tested with and reacting to tuberculin, can be of but little avail, while the enormous expense and stupendous labour involved in attempting wholesale measures of testing and slaughter throughout the Dominion render the adoption of such a scheme utterly impracticable even if there were, as there is not, a reasonable certainty, that it would achieve the desired end.

Bovine tuberculosis can only be stamped out when individual owners realize that it pays much better to keep sound cattle than to lose money and feed in maintaining herds tainted with disease. Even those who are so unfortunate as to have affected cattle, can, by adopting intelligent methods in dealing with the young stock, succeed in eliminating the disease within a comparative short period.

It is simply a matter of popular education, and I am convinced that the ear-marked cattle will be an important factor in teaching the needed lesson.

While on this subject, I desire to draw your attention to the excellent papers on Bovine Tuberculosis read by Dr. Salmon and Senator Edwards before the American Veterinary Medical Association on the occasion of their recent visit to Ottawa, a brief account of which may be found at pages 154 and 161.

During the year there were tested for export to the United States 634 head of Canadian cattle, of which number 28 reacted, the others all passing in a satisfactory manner. Of those imported from Europe and tested in quarantine, 71 in number, 11 reacted, and were ear-marked and listed.

Of other cattle there were tested 713, of which 69 were found to react.

With reference to these latter animals, it should be borne in mind that the herds to which they belonged were in almost every case strongly suspected of being diseased, this being in fact the reason for their being tested.

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GLANDERS.

I regret to have to report that it has been necessary, during the past year, to deal with a large number of cases of glanders. The disease has, as usual, prevailed to a greater extent in the North-west Territories than elsewhere in the Dominion, 219 horses having been destroyed there during the year. This is a considerable increase over previous years, but it must be borne in mind that the number of horses in the North-west Territories has increased very largely of late, and further, that owing to the additional number of inspectors employed, and the fact that all contact horses even when showing no clinical symptoms, are now tested and carefully looked after, there is more likelihood than formerly of such cases being detected and finally destroyed.

The serious outbreak discovered in the Ottawa district in August, 1902, has claimed a great deal of attention, and largely occupied the time of several of our officers. A number of minor outbreaks have also been dealt with in Ontario and Quebec, while several cases have occurred in British Columbia.

The disease made its appearance in the Yukon Territory during the winter months, and a considerable number of horses have been destroyed by the territorial authorities.

Three hundred and thirteen horses have been killed during the year by our officers, while a very large number of contact animals have been submitted to the mallein test and dealt with on the system outlined in my report of last year.

Briefly stated, this system is as follows: All horses which have been in contact with a palpably affected case of glanders, and which react to the mallein test, are ordered to be isolated, so far as stabling is concerned, from all other horses which have not so reacted. They are not allowed to be stabled on any premises except those of the owner which are definitely described in the order served upon him. They must not be sold or otherwise disposed of, and they must be available at any and all times for inspection by the officers of the department. In order to ensure identification and prevent fraud, these reacting horses are branded on the hoof with the letters 'E.R.,' and in case of the reported death of the animal, the owner is required to produce the hoof bearing the brand. At the expiry of forty days the animals are re-tested, and those which cease to react are released from all restrictions, except that they must not be sold or otherwise disposed of, while those which continue to react are kept under the same restrictions as formerly. Sixty days afterwards they are again submitted to the test, and if they then react without showing definite improvement their destruction is ordered, while on the other hand if they become ceased reactors they are dealt with in the same way as those which ceased to react at the second test. Any animal developing clinical symptoms of the disease at any time after the first test is, of course, killed as soon as possible. Where definite improvement is shown at the third test a fourth test is sometimes ordered. During the year 1,062 horses have been tested, of which 466 reacted. 64 have ceased to react, and some few of these have been entirely discharged from supervision, while the remainder are still kept under the control of the department. It is needless to say that this system entails a very great deal of arduous work among those officers of this branch who are engaged in carrying it out, but I am convinced that it is by far the safest and most satisfactory way of dealing with horses which have been in contact with glanders.

I would, however, strongly recommend that some compensation should be paid to owners of horses slaughtered after reacting to the third test, so long as they show no clinical symptoms of the disease.

While there may be a question as to the necessity, or even the wisdom, of paying compensation for horses killed when clinically affected, such animals being highly dangerous not only to other horses but also to human beings, I cannot but recognize

the hardship of destroying without compensation animals showing no external symptoms of the disease, and to all appearance quite healthy, although continuing to react to mallein. It is very important that such horses should not be lost sight of, nor allowed to drift into the ordinary channels of trade, and I think it would be less expensive to the department to pay a reasonable compensation and have them killed, than to keep them under supervision and retest them from time to time. In this connection I would say that numerous experiments conducted by the British Board of Agriculture and other European authorities have shown that there is no danger of infection from ceased reactors, and that reactors not showing clinical symptoms are not infective. The great danger, so far as the latter class of animals is concerned, lies in the possibility of the disease becoming acute under conditions favourable to its development, and this of course puts the release of such horses from supervision entirely out of the question. The experience of all other countries goes to show that the payment of reasonable compensation for animals destroyed is one of the strongest inducements to owners to report outbreaks of disease to the proper authorities.

So far as the returns for Ontario are concerned, I would beg to remind you that until August, 1902, this department did not deal with glanders in the province named, the matter having, up till that time, been left in the hands of the provincial authorities, who had no adequate machinery for carrying out proper measures for the suppression of the disease. Below is a statement giving a list of the various outbreaks, with their locations and the number of horses involved.

The figures do not include Manitoba, where glanders is dealt with by the provincial authorities, nor the Yukon, where, up to the present, the work has been in the hands of the territorial government, although an arrangement has now been consummated by which the veterinary officers of the North-west Mounted Police will act for this department there as they do in the other North-west Territories.

Province of Ontario.

	No. of horses destroyed.
Ottawa city and vicinity.....	37
Renfrew.....	9
Nipissing.....	4
Prescott.....	1
Essex.....	8
Oxford.....	5
Wellington.....	1
Grey.....	3
Ontario.....	1
Total....	69

Province of Quebec.

Quebec city and vicinity....	5
Megantic.....	4
Bellechasse.....	2
Champlain.....	2
Arthabaska.....	1
Wright.....	9
Total.....	23

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North-west Territories.

Assiniboia East...	107
Assiniboia West.....	10
Alberta.....	77
Saskatchewan.....	25
	—
Total....	219
<i>British Columbia</i>	2

PICTOU CATTLE DISEASE.

No definite results having yet been obtained through pathological research as to the true nature and causes of Pictou cattle disease, a new departure has this year been made with a view to discovering, if possible, whether or not there is any foundation for the belief entertained by a majority of the people in the district where the disease prevails that it is caused directly or indirectly by the use as food of the ragwort (*Senecio Jacobea*).

Dr. Gilruth, pathologist to the government of New Zealand, is strongly of the opinion that this weed is the cause of the disease for the reason among others, that in that country, as in Nova Scotia, the area in which the weed is found is, generally speaking, co-terminous with that in which the disease prevails. A striking corroboration of this theory was furnished during the past summer, when a number of animals having died in the eastern part of Prince Edward Island, Dr. Pethick, on making investigation, found that they had succumbed to Pictou cattle disease, and at the same time discovered, to his surprise, that the district where the disease occurred was badly infested with ragwort.

With a view to putting to a definite test the theory of the connection between the weed and the disease, I, with your approval, decided to establish a station where feeding experiments could be conducted.

After visiting the maritime provinces, and investigating the condition of affairs both on the mainland and in Prince Edward Island, I selected for the purpose mentioned a farm of 200 acres at Cloverville, near the town of Antigonish, N.S., this being one of the districts in which the disease is prevalent.

The farm in question has been leased at a reasonable rental for a term of three years, with the privilege of extension if required. Additional buildings have been erected, and 34 cattle are being purchased. These will be divided into two main lots of 16 each, while the other two head will be utilized for a special experiment. Sixteen of these animals will be fed during the winter on hay grown outside of the diseased area, and therefore containing no ragwort; sixteen others will be fed on the ordinary hay of the district, in which a considerable quantity of ragwort is found. These two lots are to be subdivided into smaller lots of four. One of these lots will receive a comparatively heavy grain ration in addition to hay; one a very moderate ration; one a limited allowance of hay only, and one a liberal allowance of hay alone. In the special class one animal is to be fed on ragwort with which will be mixed a little hay, while the other is to be fed on straw and bran only.

A number of subsidiary experiments will also be carried on with a view to determining whether or not the disease is transmissible from one animal to another, for although it has been dealt with for many years as a contagious disease I am strongly of the opinion that it does not belong to this category.

Dr. Pethick has been transferred from Central Bedeque, P.E.I., to Antigonish, N.S., so that he may be able to take charge of the station, and carry on the experiments in a careful and systematic manner. It is the intention to continue these experiments for several years, in the hope of being able to demonstrate the true nature and causes of the disease, so that intelligent means may be used for its control and

eradication. A list of the cases dealt with by Dr. Townsend during the past season is appended to his report.

ACTINOMYCOSIS.

Very few cases of this disease have, during the past year, been observed anywhere in the Dominion, and an exceedingly small number of export cattle have had to be rejected on account of being affected with it. No action is now taken regarding it by the department, beyond preventing the exportation of affected cattle.

ACTINOBACILLOSIS.

I regret to say that one, or possibly two, cases of this recently discovered disease, to which your attention was first directed in my report of last year, have been detected in Canada. It is possible that a number of the lesions hitherto considered actinomycotic have been, in reality, due to manifestations of actinobacillosis.

Dr. Higgins is at present conducting a careful bacteriological investigation into the subject, to which he refers in his report at page 99.

It is my intention to issue a special report on the subject as soon as sufficient progress has been made to warrant its publication.

ANTHRAX.

The Dominion has, during the past season, been remarkably free from outbreaks of anthrax, a very limited number of animals having been affected, as compared with previous years.

In cases where the disease was reported to the department in time, prompt action was taken with a view to preventing its spread. Vaccine was supplied to owners in districts where the disease was known to exist, 30 doses having been disposed of in this way, but no preventive inoculation was performed by our officers, it being thought better to leave this work in the hands of private practitioners.

A list of the outbreaks reported is appended.

Cornwall, Ont.....	3
North Lunenburg, Ont.....	1
Cap St. Ignace, Que.....	1
Stony Plains, Alta.....	1

BLACK-QUARTER.

A notable decrease has taken place in the number of outbreaks of black-quarter reported, and the sales of blackleg vaccine have been correspondingly light. During the year 3,909 doses were supplied to applicants as follows:—

Ontario.....	487
Quebec.....	120
North-west Territories.....	3,302
Total.....	3,909

MANGE IN CATTLE.

I am pleased to be able to state that this disease which has, for a number of years, been a serious menace to the grazing industry in Alberta and Assiniboia, appears to be yielding to the vigorous measures for its suppression adopted last year by individual owners. There is no doubt that the treatment by hand which is now in vogue is much more efficacious than the policy of dipping formerly followed. The latter,

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unless very thorough and frequently repeated, is seldom satisfactory, whereas the systematic application by hand of a suitable germicide appears to effectually destroy the acari. At the present time the disease has almost disappeared, but, following its usual course, it is likely to again develop to some extent during the winter season.

MANGE IN HORSES.

As anticipated last year, mange in horses has proved somewhat troublesome in the North-west Territories, particularly in the High River district and in the neighbourhood of Medicine Hat. All cases detected have been promptly dealt with by our officers, and a large number of horses have been quarantined and treated.

The difficulty of entirely segregating animals running on the open range is, needless to say, considerable, and this renders the task of eradicating diseases of this nature an exceedingly arduous one.

Full reports from the officers dealing with this disease are appended.

SHEEP SCAB.

Sheep scab has not prevailed to any serious extent during the past year, although a number of circumscribed outbreaks have been reported and dealt with.

The existence of the disease was detected last February in the vicinity of Sterling, Alta., two small flocks being affected. Prompt action resulted in its being completely stamped out, all the animals having been successfully treated, and afterwards slaughtered for food purposes.

In Ontario several outbreaks occurred during the year, of which perhaps the most serious was that scheduled below as having been dealt with in Haldimand county.

In this, one flock only was involved, although a considerable number of sheep were affected. The disease was traced to Victoria county, where it has been known to exist for several years.

In Wellington county a number of small flocks were found to be affected, but here the prompt measures adopted proved effective in eradicating the disease, without serious loss to owners.

I append a list of the outbreaks, showing the location of each, and the number of animals involved:—

Alberta.....	.....	2 outbreaks;	65 sheep affected
Ontario—			
Haldimand county....	.. .. .	1	“ 203 “
Wellington county..	.. .. .	11	“ 168 “
Welland county....	.. .. .	2	“ 30 “
Victoria county....	.. .. .	2	“ 11 “

SWAMP FEVER.

But little progress has been made this season in the investigation being conducted by Drs. Bell and Torrance into the nature and causes of the disease known as swamp fever. Fortunately for horse owners, there has been a marked diminution in the prevalence of the malady, and a consequent lack of material available for research work. A short report by Dr. Torrance, which may be found on page 152, gives the details of what little has been done.

Early in the season I, with your approval, arranged with Dr. Wolferstan Thomas, Fellow in Bacteriology of McGill University, who has had exceptional opportunities for the study of diseases due to Trypanosomata, to go to Winnipeg and take part in the investigation. His appointment to a position on the staff of the Liverpool School of Tropical Medicine prevented the carrying out of our intentions in this regard.

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In view of the lack of material, it is perhaps as well that the expense involved in his engagement was not incurred.

TYPHOID INFLUENZA.

Typhoid influenza which, for a number of years, has been known to exist in western Canada, has recently made its appearance among horses in various parts of Ontario. From several districts it has been reported to the department as a new and mysterious disease. Investigation, however, soon demonstrated its true nature, and the advice given by our officers when followed by local veterinarians has been largely instrumental in lowering the death rate.

FOOT AND MOUTH DISEASE IN NEW ENGLAND.

On November 26, 1902, I learned, through a cable from the office of the High Commissioner in London, that the British Board of Agriculture had heard a rumour of the existence of Foot and Mouth disease in the neighbourhood of Boston, Massachusetts. Unwilling to give credence, without due inquiry, to a report of this nature, I immediately telegraphed to Dr. Salmon, Chief of the Bureau of Animal Industry at Washington, and to Dr. Austin Peters, Head of the State Cattle Bureau of Massachusetts. During the forenoon of November 27, I received telegrams from both of these gentlemen confirming the reports previously heard. Instructions were at once issued that all stock cars entering Canada, consigned either directly or indirectly, from the New England States, should be thoroughly cleansed and disinfected before being allowed to cross the international boundary. All cars in the railway yards at Montreal, en route from New England points, were also ordered to be cleansed and disinfected immediately. These orders, which I may say, went into effect and were acted upon at once by our officers in Montreal, were deemed of vital importance, because of the large numbers of cattle consigned from Canada for shipment to Britain via Boston and Portland. Cars conveying such cattle, if used, as they not unfrequently are, for local traffic in New England, might easily have conveyed the infection to many points in the Dominion, the disease being notorious for the rapidity with which it spreads along lines of transportation.

As you are aware, an Order in Council was passed, without delay, forbidding the entry into Canada from any of the New England States of cattle, sheep and other ruminants and swine, as also of their hides, horns and other similar products. The most stringent measures were adopted to ensure the effective carrying out of this order. Special officers were stationed at all points where railways crossed the boundary to see that the order was not infringed, and to superintend the cleansing and disinfection of all cars in any way likely to convey the disease. The services of a number of our regular inspectors were called into requisition, while one veterinarian, Dr. E. P. Ball, of Rock Island, Que., was specially appointed, and constantly patrolled the country along the boundary between the railway lines, watching, warning and generally instructing farmers and others as to the need for keeping a close guard against the entry of American stock.

These precautions were maintained without intermission until September 26, 1903, when, on the certainty of the disease having been completely stamped out by the energetic and thorough action of the United States Bureau of Animal Industry, an order was passed removing the restrictions, and allowing trade to resume its usual channels.

It is impossible to speak too highly of the work of the United States Bureau of Animal Industry in stamping out the outbreak in New England. Not content with following the methods usually adopted in dealing with Foot and Mouth disease, Dr. Salmon resolved to take the extreme but, by the results, fully justified step of slaughtering all infected herds. As the percentage of actual mortality from this malady

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is very small, the adoption of the slaughter system of eradication gave rise to considerable adverse criticism and to some opposition. There is now, however, no room for doubt that taking into consideration the magnitude of the interests at stake and the tremendous losses which would have resulted from the distribution of the disease over this continent, Dr. Salmon displayed true wisdom in deciding to stop the spread of the contagion by slaughtering each affected herd as soon as possible after the discovery of the disease among its members.

I may say that while the alarm was at its height, and indeed for some time after the danger was over, the existence of foot and mouth disease in Canada was frequently reported to this branch. All such reported outbreaks were carefully investigated, with the result, that in no single instance was the disease found to exist.

In view of the lack of practical knowledge of the malady which fortunately prevails among Canadian stock owners, it was thought advisable to issue a special bulletin on the subject, a copy of which is attached to this report.

I feel constrained to express my grateful appreciation of the courtesy shown to me by Dr. Salmon, Chief of the Bureau of Animal Industry, and by Dr. Bennett, his officer in charge at Boston, who promptly answered all inquiries, and kept me fully informed as to the conditions prevailing in the quarantined area.

EXPORT INSPECTIONS.

Owing to the scheduling of the New England States by the British authorities which followed the appearance of foot and mouth disease in November, 1902, a much larger number of cattle have been shipped from Canadian ports than would have been the case under ordinary conditions. The correspondingly heavier duties which devolved upon our inspectors at these ports have been performed in an eminently satisfactory and thorough manner.

As an additional safeguard, in case of difficulty arising over any shipment, inspectors now furnish special reports for each lot of animals dealt with, giving details as to numbers and condition, as also names of owners and of the vessels on which the stock is loaded. This method renders it possible to trace back animals with greater facility than was formerly the case, while it also makes the inspector individually responsible for his work.

In this connection I may say that I do not consider the present method of marking export animals at all satisfactory, and that it is my intention, with your approval, to inaugurate in the near future a more effective system, whereby the identification, and if necessary the tracing, of each individual will be rendered comparatively easy.

In presenting the accompanying statement of the animals inspected by our officers during the year, I would point out that, owing to certain conditions, it does not constitute a complete record of the live stock exports of the Dominion. A considerable number of Canadian animals are exported to Great Britain via the United States, and these, being inspected at American seaports, are not, as a rule, recorded by our officers. I cannot regard this feature of our export trade as satisfactory, and would strongly recommend the adoption of a system whereby all Canadian stock consigned to countries other than the United States should be carefully inspected and marked by Canadian officers.

Again, a large number of animals are yearly exported from Canada to the United States which, as a result of the arrangement made by you with the American Secretary of Agriculture in 1897, are not inspected before shipment, and consequently do not appear in the records of this department.

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TABLE showing animals inspected at the following ports.

	Cattle.	Horses.	Sheep.	Swine.
Montreal to Great Britain	147,876	432	59,743	
Montreal to South Africa	305	64		
Quebec to Great Britain	6,519		2,227	
Three Rivers to Great Britain	152			
St. John, N.B., to Great Britain.. . . .	31,646	99	13,267	
" to United States.. . . .	25			
Halifax to Great Britain	4,014	17	426	
" Bermuda	15	60	736	3
" West Indies	11	18	709	5
" Newfoundland	3	1	17	7
" United States		1		
Charlottetown to Great Britain	47		1,587	
" Newfoundland	1,084	57	2,072	64
Victoria, B.C., to United States.. . . .		17		2
Total	191,697	766	80,784	81

Total animals exported from above ports, 273,328.
Of the above, 48,880 cattle and 2,924 sheep were from the United States, and 65 cattle were from Mexico.
Animals rejected at the following ports:—

	Cattle.	Horses,	Sheep.
Montreal	280	4	134
St. John, N.B.	75	—	56
Total	355	4	190

Of the above, 7 cattle at Montreal and 5 at St. John were rejected for actinomy-
cosis; the rest of the animals rejected were suffering from lameness or injuries re-
ceived during transportation, but showed no indication of contagious or infectious
disease.

IMPORT INSPECTIONS.

I.—From Europe.

Port.	Cattle.	Horses.	Sheep.	Swine.	Goats.
Lévis quarantine, Quebec	245		231	124	93
Montreal		288			
St. John, N.B.	5	18	6		
Halifax	9	3	*6		
Charlottetown, P. E. I.			*6		
Total	259	309	243	124	93

* These sheep were inspected both at Halifax and Charlottetown.

II.—From United States.

Port.	Cattle.	Horses.	Sheep.	Swine.	Mules.
St. John, N. B.			1		
Halifax.		12			
Charlottetown, P. E. I.		1			
Niagara Falls, Ont.	127		27	28	
Point Edward, Ont.	41		224	19	
Windsor, Ont.	36	16	1	6	
Winnipeg, Man.	3,175	9,526	80	395	675
Deloraine, Man.	498	427		4	5
Killarney, Man.	249	520	3	15	1
Emerson, Man.	758	694	48	37	10
Gretna, Man.	53	266		9	19
Crystal City and Snowflake, Man.	704	872	29	116	2
North Portal, Assa.	23,969	12,240	139	559	388
Maple Creek, Assa.	3,129	3,370	8,269		21
Medicine Hat, Assa.	73	3,430			6
Wood Mountain, Assa.		1,574			
Conlts, Alta.	6,029	8,158	7,919	174	46
Cardston, Alta.	6,089	3,578			
Nelson, B. C.	101	925	4,656	10	
Gateway, Cranbrook and Rykerts, B. C.	43	1,041		1	1
Victoria, B. C.	54	90	335		4
Nanaimo, B. C.					25
Total.	45,038	46,740	21,731	1,373	1,203

Horses brought from the United States are not, as a rule, subjected to inspection except when entering Manitoba, the North-west Territories and British Columbia.

III.—From Mexico.

Port.	Cattle.	Horses.	Sheep.	Swine.	Goats.
North Portal, Assa.	23,311	1,004			31
Conlts, Alta.	942				
Toronto		200			
Total.	24,253	1,204			31

IV.—From Newfoundland.

Port.	Cattle.	Horses.	Sheep.	Swine.	Goats.
Halifax		1			

MEXICAN CATTLE.

I, last year, reported the importation to the North-west Territories of a considerable number of Mexican cattle. This trade has since developed to a much larger extent, the number of these cattle brought in during the past season having reached the enormous total of 24,253. As these animals originate south of the United States

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Texas fever quarantine line, I decided, as soon as the first shipments were reported, that it would be necessary to take every possible precaution to prevent the introduction of the Texas fever tick, *Boophilus Annulatus* (bovis), as this parasite is the real source of danger, and the only agency by which, under ordinary conditions, the disease can be communicated from one animal to another.

Owing to our rigorous winter climate there is no danger of Texas fever obtaining a permanent foothold in the Dominion, but it is within the range of possibility that tick infested cattle entering the country during the summer months might be the means of introducing the disease, and of causing considerable loss before the first frost put a stop to its ravages.

As some anxiety in regard to this subject naturally exists among western cattle owners, I think it will be well to give a brief account of the safeguards now maintained against the introduction of the disease.

Bureau of Animal Industry Order No. 107 of date March 13, 1903, gives notice that a contagious and infectious disease known as splenetic, southern or Texas, fever exists among cattle in the district described below:—

‘All that country lying south, or below, a line beginning at the north-west corner of the State of California; thence east, south and south-easterly along the boundary line of said State of California to the south-eastern corner of said state; thence southerly along the western boundary line of Arizona to the south-west corner of Arizona; thence along the southern boundary lines of Arizona and New Mexico to the south-eastern corner of New Mexico; thence northerly along the eastern boundary of New Mexico to the southern line of the State of Colorado; thence along the southern boundary lines of Colorado and Kansas to the south-eastern corner of Kansas; thence southerly along the western boundary line of Missouri to the south-western corner of Missouri; thence easterly along the southern boundary line of Missouri to the western boundary line of Dunklin county; thence southerly along the said western boundary to the south-western corner of Dunklin county; thence easterly along the southern boundary line of Missouri to the Mississippi river; thence northerly along the Mississippi river to the northern boundary line of Tennessee at the north-west corner of Lake county; thence easterly along said boundary line to the north-east corner of Henry county; thence in a northerly direction along the boundary of Tennessee to the north-west corner of Stewart county; thence in an easterly direction along the northern boundary of Tennessee to the south-western corner of Virginia; thence north-easterly along the western boundary line of Virginia to the northernmost point of Virginia; thence southerly along the eastern boundary line of Virginia to the north-east corner of Virginia, where it joins the south-eastern corner of Maryland at the Atlantic ocean.’

The above line is, however, subject to variations, inasmuch as quarantine regulations established by state authorities are not unfrequently adopted by the Secretary of Agriculture when he is satisfied that it is safe to follow this course. Cattle from that portion of the United States lying south of the quarantine line can, except in winter, be shipped north, east or west of the said line only for immediate slaughter, and then under special restrictions, from which the following may be quoted:—

They can only be unloaded for any purpose in pens or yards set apart for infected cattle, and kept separate and distinct from any chutes, pens and yards used by cattle originating outside of the quarantined area. All cars carrying cattle from the infected area bear printed placards stating that they contain southern cattle, and all waybills, conductor's manifests and bills of lading, of such shipments by cars or boats have a notation to the same effect plainly written or stamped upon them. Where cattle are reshipped from one point to another the same precautions are observed. No boat carrying cattle from the quarantined area is allowed to receive on board any cattle from outside thereof. No cattle from the infected district can be shipped to outside points unless proper facilities have been provided for transferring them to stock yards

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and slaughter houses, without passing over public highways. Exception is made to this rule, however, where permission for such passage is first obtained from the local authorities. All cars and boats, chutes, alleys and pens used by these cattle during transportation at points of destination must be thoroughly disinfected, and no cars which have carried such cattle are allowed to be again used until after they have been thoroughly cleansed and disinfected.

The above regulations are strictly observed from February 1 to October 31, but cattle from the quarantined district to outside points may be shipped without inspection during November, December and January. So far, therefore, as cattle from that portion of the United States south of the quarantine line are concerned, there is evidently no risk to be apprehended, as such animals are not allowed to be shipped north at all during the dangerous season, except for the purpose of immediate slaughter.

The following is the rule observed by the United States government as to the introduction of cattle from Mexico:—

‘Cattle from the Republic of Mexico may be admitted into the United States, after inspection according to law, as follows: Cattle free from splenetic, or Texas, fever, and from contact therewith during the six months preceding such inspection, and which have been grazed in a locality free from infection of such fever, may be admitted into any part of the United States. If destined to points in the non-infected area, a special permit must be obtained from an inspector of the Bureau of Animal Industry, said permit being issued according to the regulations of said bureau. The cattle for which said permit is issued must not be driven through the infected area, nor be unloaded in any part thereof except at such a point as may be duly designated by an order issued by this department. If shipped in infected cars or unloaded in the infected area, except as above stated, they will be subject to the regulations concerning infectious cattle.’

It is thus plainly evident that the United States government considers certain parts of the Republic of Mexico to be free from the infection of Texas fever, inasmuch as they authorize the admission of cattle from such localities into any part of the United States under certain conditions, which conditions, I may say, apply with equal force in the case of cattle shipped in bond to Canada as to those consigned to the northern states for grazing purposes.

In addition to the above mentioned certificate from the United States Bureau of Animal Industry, on the production of which I insist, special precautions have been adopted during the last two seasons whereby these cattle from Mexico are subjected to a rigid inspection before being allowed to enter the Dominion.

Owing to lack of proper yard accommodation at North Portal, a veterinary surgeon is now stationed, during the shipping season, at Velva, N.D., a divisional point about 100 miles south of the international boundary. In June last this officer reported having discovered a number of ticks on a trainload of cattle consigned to Stair, Assa. He was instructed to hold the cattle, and send forward immediately specimen ticks for identification. This was done, but before the specimens, which proved to be the *Ornithodoros Meginini*, and therefore harmless, were received here, a communication came to hand from Dr. Salmon, stating that a large shipment of Mexican cattle were being held at El Paso, owing to the discovery that a number of them were badly infested with the *Boophilus Annulatus*, the specific tick of Texas fever.

Dr. Salmon also reported that one trainload had unfortunately been allowed to go forward, and was now, as far as he could learn, in Canada. The remainder of the cattle were held at El Paso for treatment, most of them being eventually sent forward. Considerable difficulty was experienced in locating the trainload of cattle referred to as having reached Canada, but they were eventually identified, and, although they had been duly inspected without any ticks being detected, they were held on an isolated range, sufficiently long, to give assurance that no outbreak of the disease was going to follow their importation.

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The remaining cattle were held at El Paso, and after treatment and careful inspection were granted certificates and allowed to proceed. Our officer at Velva made a careful examination, but was only able to find one Texas fever tick in the whole shipment.

The explanation given by Dr. Salmon was that these cattle, which originated in Coahuila, Mexico, were free from disease when inspected at the boundary, but that on being driven through western Texas to the railway they became infected, the presence of the ticks being detected on a second inspection at El Paso.

The incident, however, indicates that in spite of all precautions the introduction to Canada of tick infested cattle is within the range of possibility.

That there is justification for the adoption of a policy of watchfulness is shown by the following quotation from Dr. Salmon's letter:—

‘There must always be more or less suspicion with reference to Mexican cattle, for the reason that there are no regulations enforced there preventing the driving of infected animals to any part of the country, so far as I am informed; and while Chihuahua may be entirely free to-day, it might be infected within a week, and cattle driven across infected trails might acquire small ticks which would develop later. The inspection, therefore, can not be considered as absolutely certain, although we have had no trouble develop with any cattle.’

In consideration of the facts here stated, and of the large interests involved, I cannot but recommend the maintenance of special precautions as regards this new development of our stocker trade.

The best guarantee of immunity would, unquestionably, be the confining of the importation of Mexican cattle to a period of the year when the climatic conditions preclude the possibility of infection.

On the other hand, I have the assurance of Dr. Salmon that no cattle will be shipped to Canada that would not be allowed to enter the northern states for grazing purposes.

Under existing conditions, therefore, we are in an even better position than those states, as we enjoy the additional safeguard of the extra inspection made by our own officers at the international boundary.

I propose to make a further investigation of the whole subject during the coming winter, and hope to be in a position to recommend a definite policy before the trade recommences next spring.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

This association has now been in existence for forty years, and throughout the whole of that long period it has been of great benefit to the veterinary profession on this continent, although, until very recently, its operations were largely confined to the United States. Originally styled the United States Veterinary Medical Association, its members decided in 1898 to extend its field of usefulness, and by assuming the title ‘American’ remove at once the scruples of those Canadian and Mexican veterinarians who, while sympathizing fully with its aims and objects, did not clearly see their way to joining a body which could not officially recognize their existence.

On the membership roll are now to be found the names of many leading Canadian practitioners, who yearly attend the meetings, and who are appreciative and enthusiastic friends and supporters of what is to-day the most progressive and influential veterinary organization in the world.

Feeling that the meeting of such an association in Canada would tend to stimulate the interest of Canadian veterinarians in their professional work, and lead them to consider means for the proper advancement of comparative medicine in the Dominion, I, last year, when at Minneapolis, invited the members to hold their next annual convention in Ottawa. Although a meeting had never before been held out-

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side of the United States, the invitation was cordially accepted, and during the first week of last September a large number of the leading veterinarians of America gathered in Ottawa.

Many valuable papers on subjects of interest, not only to the profession but to stock owners and the public generally, were read and discussed, and much useful information was elucidated and put in concrete form for future reference.

The contribution to the literature of tuberculosis made by Dr. Salmon, Chief of the United States Bureau of Animal Industry, which is published herewith, is not only interesting and instructive in itself, but is specially notable inasmuch as it disposes effectually of the contentions of Professor Koch, who two years ago, astounded the scientific world by advancing the theory that human and bovine tuberculosis were entirely different, and that it was practically impossible to communicate the disease from the human to the bovine species or vice versa. Although this theory was entirely at variance with the views held by almost all other students of the subject, many of whom have a much wider and more practical experience of this particular phase of the subject than has the great German, it was universally felt that his opinions were entitled to respect, and that the ground must be again carefully traversed before they could be contradicted with that measure of authority which, under the circumstances, the public would demand.

Many leading European scientists have since brought forward strong proof that Koch's position was untenable, but it remained for Dr. Salmon to demonstrate to the people of America that human and bovine tuberculosis are clearly intercommunicable, and that comparative pathologists had made no mistake in sounding, as they did, an early note of warning against the use of meat and milk from diseased animals. While in one sense the corroboration of Professor Koch's contention would have been more acceptable and reassuring than its successful denial, it is a great satisfaction to those who have all along held opposite views, to know with certainty that their conclusions, arrived at through long experience, are well founded and incontrovertible.

The paper of Senator Edwards on the Bang system of dealing with bovine tuberculosis ought to be of great interest to all breeders and owners of cattle, more particularly to owners of valuable stock, the slaughter of which would involve a considerable and, as pointed out by Mr. Edwards, unnecessary sacrifice.

Another valuable and interesting paper which I have also considered it advisable to publish was that read by Dr. Higgins, pathologist to this branch, on 'Anthrax and Blackleg.' Much haziness prevails in the public mind as to the points of difference between these two distinct maladies, and not a few veterinarians of the older school will be none the worse of reading this short and instructive monograph.

The other papers presented at the meeting were numerous and interesting, but the three above mentioned have been selected for publication as being of special value in the work of this branch of your department.

In addition to the technical and professional features, the programme was lightened by interesting addresses from prominent public men.

A large number of Canadian practitioners were in attendance, and advantage was taken of the opportunity thus afforded to hold a special meeting for the purpose of discussing the status of the veterinary profession in the Dominion, with special reference to raising the standard of education. This step is considered necessary, in view of the rapid advance of scientific knowledge and the wider field now covered by comparative pathologists.

The discussion, which was animated and intelligent, culminated in the appointment of a committee to confer with the college authorities, with a view to the adoption of an extended curriculum, and a higher standard of matriculation.

One day was spent at Rockland, whither, through the kindness of Senator Edwards, the whole party, numbering nearly four hundred, were conveyed free of charge,

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and where they experienced the open handed hospitality for which the proprietor of Pine Grove farm is famous.

It was here that the papers on tuberculosis were read and discussed, and the occasion was one not to be lightly forgotten by those fortunate enough to be present.

All the other meetings were held in the City Hall, Ottawa, which was kindly placed at the disposal of the association by the municipal authorities, who also assisted in a most generous and spirited manner in entertaining the visiting veterinarians and the ladies accompanying them.

Various social features were arranged with a view to rendering the occasion pleasant as well as profitable to the visitors, who, it may be said, expressed themselves as highly pleased with their experiences at the Canadian capital. The thanks of the committee on local arrangements are due to the Government of Canada, the Ottawa City Council, the Ontario Veterinary Medical Association, the Veterinary Association of Manitoba, the Central Canada Veterinary Association, Professor Andrew Smith, of the Ontario Veterinary College, and, last but not least, to Senator Edwards for valuable and tangible assistance in carrying out the programme.

The officials of the Department of Agriculture, especially the officers of the Experimental Farm, also did much to add to the success of the meeting.

QUARANTINE STATIONS.

I have to report that, owing to unavoidable circumstances, no great progress has been made during the year in the direction of perfecting the arrangements now existing for the quarantining of stock imported by sea.

The station at Point Levis, on which many repairs and improvements have this year been made, is, in most respects, a model establishment, being exceedingly well conducted by Dr. Couture, whose long experience and deep interest in his work render him a most valuable officer.

In one essential point, however, it is capable of great betterment. Under existing conditions, imported animals are compelled, after landing, to traverse the public highway for a considerable distance in order to reach the quarantine inclosure.

Up to a very recent date no practical means of overcoming this difficulty, at a reasonable cost, has presented itself.

An electric railway has now, however, been constructed to within a very short distance of the station, and I would strongly recommend that an arrangement be made for its extension into the grounds. If, in addition, the receiving shed were moved from its present position to the I. C. R. wharf, which is conveniently situated, animals could be taken by car direct from the ship to the quarantine station and much present risk and labour eliminated. The advantage to animals leaving quarantine would also be very great, as they could be loaded on the grounds instead of being, as now, driven for a considerable distance just before shipment.

At St. John, N.B., matters are by no means satisfactory. No regular quarantine station exists here, and the premises rented for the purpose are not at all suitable for the proper and healthful isolation of imported animals.

The subject has been receiving the earnest attention of Dr. Frink, the officer in charge, who has, during the year, furnished several exhaustive reports, and who is deeply interested in the proposition to place matters on a better and sounder basis. So far, however, little progress has been made. In company with Dr. Frink, I examined, in August last, a plot of land belonging to the Department of Railways, which I am satisfied would be in every way suitable for our purpose, and negotiations are now being carried on with a view to its transfer to this department.

Conditions at Halifax are somewhat similar. The old quarantine station at Dartmouth has now been abandoned; the buildings, which were mere shells erected many years ago, having fallen into such disrepair as to be totally unfit for the housing of animals, while the location was inconvenient to a degree.

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With the co-operation and assistance of Dr. Jakeman, our officer at Halifax, I have been for some time endeavouring to secure a site for a new station, but hitherto without success. I visited Halifax twice during the year, and examined a number of properties, but have not yet been able to obtain a suitable site at a reasonable figure.

While few animals are imported via Halifax, it is important that accommodation should be available there when it is required.

No important changes have taken place in the arrangements for inspecting animals imported from the United States. At Niagara Falls the resignation of Dr. Boulter, our officer there, necessitated a new appointment, and Dr. T. E. Watson has been placed in charge of the quarantine station, with authority to make necessary inspections.

At Melita, Man., the death of Dr. Livingstone has left us without a regular officer at that point, although inspections are being made when required by a veterinarian employed by the customs officer.

The extension of the Great Northern Railway across the international boundary to Elko, B.C., rendered necessary the removal of the customs office from Phillipps to Gateway, which is situated on the railway seven miles west.

In order to facilitate inspection, a corral has been erected by the department at this point.

Difficulties are constantly arising, owing to animals being presented for entry at customs ports where we have no resident officer, and where it is therefore impossible to make satisfactory inspections without annoying and vexatious delays.

I would again impress upon you the urgent necessity of selecting points where animals imported from the United States may be properly inspected, and, when necessary, quarantined. This is the method followed by the United States authorities, and I am satisfied that if importers were once fully informed as to the points at which animals could enter it would be found much more convenient and satisfactory for all concerned than the arrangement at present existing.

CAR INSPECTION.

As stated in my special reports on hog cholera and other diseases, a good deal of attention has been paid during the past year to the cleansing and disinfection of stock cars. This work, unless supervised, is apt to be either neglected altogether or performed in such a perfunctory manner as to be of little avail.

The strict methods adopted in dealing with cars coming from the New England States during the prevalence of foot and mouth disease there, the insistence on cleanliness in cars entering Canada at Windsor and Sarnia, as well as at Gateway, B.C., and other points, and the methods adopted to insure disinfection of cars used for the conveyance of live hogs from the quarantined area in Kent county, Ont., have all had a salutary effect upon the officials of the various railways concerned. A proper appreciation of the maxim that 'whatever is worth doing is worth doing well' is indispensable for the satisfactory performance of this work.

The higher officials of the various roads, as a rule, realize the importance to their companies, as well as to the public, of doing what in them lies to assist the department in its efforts to prevent the spread of contagious disease among animals, the carriage of which constitutes one of their most lucrative sources of revenue.

It is often, on the other hand, a difficult task to impress upon the unthinking and not unfrequently overworked agent or yardmaster the necessity for properly cleansing and disinfecting a car which looks to him exactly like scores of others allowed to go on their way without interference.

The public interest, however, demands that the lesson be thoroughly learned, and it is my intention to see that all orders on this subject issued by the department are, as far as possible, carried out in a thorough and systematic manner.

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STOCK YARDS.

Considerable improvement has been effected since the date of my last report in the condition of stock yards throughout the country. In view of the importance of the yards at Schreiber, which are extensively used for the accommodation of stockers going west as well as for export cattle bound to the sea-board, I, last winter, instructed Dr. Hopkins to make a thorough inspection, and report fully as to the conditions prevailing there, many complaints having been received from shippers of live stock. His report, which was very full, was laid before the Canadian Pacific Railway authorities in Montreal, with the result that a marked improvement in the condition of the yards has been brought about, as reported by Dr. Moore, who made an inspection later in the season.

The yards at North Bay have been rebuilt and greatly improved. At other points also, good work has been done.

The Canadian Pacific Railway yards at Montreal are still in an exceedingly unsatisfactory condition, being quite unfit for use in wet weather. The company is considering the erection of new yards in a more suitable location, and the matter has therefore not been pressed. Failing an early decision on this point, it will be necessary to take steps to have the present yards put into decent repair.

West of the lakes considerable improvement has been effected. At Winnipeg entirely new yards have been constructed, and are being conducted in a satisfactory and businesslike manner.

At Moosejaw the yards have been repaired and put into reasonably decent condition, but there is still room for great improvement at this point.

The accommodation at Calgary has been increased, sheds have been erected and other improvements carried out. At many other points in the Territories new yards have been constructed, while at others repairs and enlargements have been effected.

At Vancouver, where a considerable shipping trade demands accommodation, the facilities are altogether inadequate. Here, as at Montreal, the Canadian Pacific Railway Company has in contemplation the removal of the yards to another site, and therefore desires to avoid the undertaking of extensive repairs to those now in use. Temporary improvements are, however, being carried out.

Mr. Peterson, Inspector of stock yards and cars for the lines west of Winnipeg, has kept in close touch with his work, and has personally seen to most of the matters coming within his jurisdiction.

Full details regarding the work of this branch throughout the Dominion will be found in the individual reports of the various inspectors published herewith.

I have the honour to be, sir,

Your obedient servant,

J. G. RUTHERFORD,

Chief Veterinary Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

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No. 16.

REPORT OF THE PATHOLOGIST.

(CHAS. H. HIGGINS, B.S., D.V.S.)

OTTAWA, October 31, 1903.

SIR.—I have the honour to transmit this, my fifth annual report as an officer of the Department of Agriculture, being my second as pathologist, covering my work from November 1, 1902, to October 31, 1903.

During the first six weeks of this period the work was conducted in the temporary quarters furnished at the Imperial building on Queen street, in the heart of the city. On December 15 the apparatus was moved to the new building on the Experimental Farm, specially designed for this work. Some unavoidable delay was experienced in the placing of the apparatus, which was but a natural sequence to moving. At the present time the laboratory is in full working order, and the equipment is sufficient to conduct with facility the routine investigations and diagnoses which are required.

In equipping this laboratory the aim has been to select standard apparatus, which was thoroughly up to date in every respect, and also some of the more important labour saving devices for use in this line of work. We are, I think, amply repaid for the manner in which this institution has been equipped, for nothing but praise has been received from some of the foremost laboratory men on this continent who have visited it.

The gas installation is giving perfect satisfaction, regardless of the many discouragements which were offered at the outset. This gas plant will be fully described later in this report.

The most serious drawback to the work at the present time is the lack of assistance in carrying out the various lines of investigation. To conduct the routine work of a laboratory which is attaining the size of this one, and at the same time carry on original investigations, not only on one subject, but on several, single handed, is a herculean task, and for this reason many of the interesting and valuable investigations under way have had to be practically discontinued. (The force of this statement is more apparent from the fact that during the past year there have been received one hundred and six series of specimens as compared with thirty-two of the year preceding.) Particularly is this the case when it is borne in mind that the field for investigation and original research on comparative lines in Canada is practically unlimited, and also, that many of the specimens received require considerable original work before correct diagnoses can be given. Then too, there is a desire to pursue these investigations further than the mere diagnosis, when we have an affection which is entirely or practically new to a certain section of the country, and also is this the case when we encounter conditions upon which absolutely nothing has been written.

Much material of this nature has been received; with the result that it is possible to present in a new aspect some of the diseases occurring in Canada, but much of which it is necessary to pass over, due to the presence of routine work which requires immediate attention.

A detailed statement of the various specimens received, with their diagnoses, will not accompany this report, save in instances where such are considered under the various headings dealing with special investigations.

I cannot lay too much stress upon the point, that the fuller investigation of the various diseases as seen in Canada would not only prove interesting to those conducting such investigations, but would also prove of inestimable value to the country, in placing at the disposal of the mass the means of more easily combating, if not wholly preventing, serious outbreaks of contagious disease.

The needs of the laboratory, for the routine as conducted at present, are very small, but if the work is to render the best service to the livestock interests of this country there are many things which can be greatly improved upon. The needs of an institution of this sort are in proportion to the amount of work which is being carried on, and if we are to undertake original work along lines which are briefly outlined under some of the subjects taken up in this report, the equipment will of necessity have to be increased to meet the additional demands.

Without further preliminary remarks, details will be given under the various headings which follow.

ANTHRAX.

No original work has been attempted with this affection nor has the production of vaccine received consideration.

This disease is one which frequently receives attention at the laboratory, through the requests for diagnosis, as to whether or not the causative agent is present in material from dead animals, more particularly those in which death has been sudden.

During the past year material has been furnished from fifteen suspected cases, in five of which the causative agent of the disease was found. Three of these cases were in Cornwall, Ont., one at Cap St. Ignace, Que., while the other was at North Lunenburg, Ont.

Much of the material came from the eastern townships, in the vicinity of Sherbrooke, but in none of these instances was the bacillus anthracis found. (In all probability death was due to the bacillus which we are at present studying to determine its pathogenic powers. This bacillus appears almost identical to the bacillus bovis-septicus, the causative agent of haemorrhagic septicaemia in cattle, and will receive further consideration under that heading.)

TUBERCULOSIS.

There have been a number of specimens suspected to contain lesions of tuberculosis submitted for examination, the results in nine of which have been positive.

A large number of small animals have been inoculated for the recovery on artificial media of cultures of the causative bacillus. These cultures have been used in the experimental preparation of tuberculin, and have been tried on various liquid and solid media with varying results. This work of accustoming a culture of tubercle bacilli to a given medium is a very tedious one, but is nevertheless very interesting, and I have been able to obtain cultures which produce good tuberculin through this method. The media used for the artificial culture of the bacilli have been very extensive, but principally confined to well known formulae. One of the newer (for isolation), an egg medium,* consists of the yolk and white of egg mixed together and solidified in a serum oven. This has been found very serviceable, the more so on account of its easy preparation. I have, however, modified the sterilization somewhat, by placing a small quantity of water in the serum oven, which, during the process of solidifying, provides sufficient moisture in the tube, thus doing away with the necessity of adding water to furnish moisture at the time of inoculation.

* M. Dorsett.—The use of eggs as a medium for the cultivation of the *Bacillus Tuberculosis*.—Annual Report of the Bureau of Animal Industry. 1901, p. 574.

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The writer, in 1901, experimented with the acid brain media of Ficker,* and also with original formulae, using the brains of the horse, cow, dog, hog and sheep. The results were varying, some, however, giving remarkably good growths in a minimum period. (These results have not been published, for the reason that it is desirable to repeat a great deal of the work, in order that the findings may be fully verified, an opportunity for which, has not up to the present time, offered itself.) Some of the brain agars prepared at this time were very serviceable in routine investigations, though at the present time they are not used, owing to the difficulty in their preparation.

The conducting of experimental work on distinctly original lines has not been undertaken, on account of the impossibility of finding time with the other laboratory routines to give to it the attention that would be required to obtain data of value.

The work of the Bureau of Animal Industry of the United States, as presented in a paper read by Dr. D. E. Salmon† at the farm of Senator Edwards, Rockland, Ontario, during the recent meeting of the American Veterinary Medical Association, the results of which indicate that bovine and human tuberculosis are due to an identical bacillus, refutes the statement of Koch as given at the congress on tuberculosis, held at London in 1901.

Neufeld‡ gives the result of Koch's experiments in the immunization of cattle to tuberculosis. They substantiate his assertions concerning the identity of the bacilli of bovine and human origin as given at the London Congress in 1901.

The experiments, conducted under the supervision of each of these two men, are the result of very nearly two years' research, and have been very carefully carried out. The conclusions are carefully drawn, yet there is still as wide a divergence of opinion as formerly on this important subject, one upon which the majority of bacteriologists and pathologists have done more or less original work.

In view of the controversy which still exists, and the wide importance of the subject, I would urge that work of a similar character be taken up here, that this branch of the department may add scientific facts of world wide interest to our present knowledge of this disease. If it is desired that such experiments be undertaken, I feel safe in saying that a series of experiments could be devised along entirely different lines than those followed by the investigators mentioned, and further, that they would in all probability not only solve the problem of the relationship between the two diseases, but would also lead to their more scientific prevention and treatment.

I would also urge that something along the line of immunization be taken up. This subject is one of the foremost at the present time, and we should, I think, add to the scientific data which is being published on the subject.

It would be a pleasure to take up this work, particularly that with reference to the relationship of bovine and human bacilli, as it is still an open question, and much yet remains to be accomplished.

TUBERCULIN.

During the past year there has been dispensed at this laboratory 143,460 minims of tuberculin, a sufficient quantity to test 2,391 head of cattle.

The tuberculin dispensed was obtained from Koch's laboratory, prepared under the direction of Dr. Liberty, each bottle bearing his seal.

* Centralblatt F. Bact., Etc., 1900, Abt. 1, Bd. XXVII., No. 14-15, p. 504 and No. 16-17, p. 591.

† Salmon.—Bovine and Human Tuberculosis, American Veterinary Review, Vol. XXVII. No. 7. Page 572.

‡ Neufeld.—Deutsche Med. Wochenschrift, Berlin and Leipsic, Bd. XXIX. No. 37. Abstract, Jour. Am. Med. Ass. Oct. 3, 1903.

A quantity of tuberculin has been manufactured at the laboratory, some of which was used on experimental animals (cattle) known to be tuberculous, and in every instance a pronounced reaction was obtained. The small laboratory experimental animals have been repeatedly tested with this tuberculin, and in every instance reactions have occurred in tuberculous animals, while healthy animals have manifested no rise in temperature or other clinical symptoms as a result of such inoculations.

GLANDERS.

Material from a large number of cases of glanders has been dealt with. The writer has also conducted autopsies on a number of the more interesting subjects which were found during the outbreak in this city of last fall.

One case in particular was very interesting, on which, at the suggestion of Dr. Rutherford, an autopsy was held to ascertain whether or not the lesions resulting from the injection of mallein into glandered horses, as described by Hunting, were present. This animal received a large dose of mallein (three times the regular amount used in routine testing), the autopsy being held on the second day after the injection. Previously the subject had been tested on two occasions, and at the time of this third test was commencing to show clinical symptoms, namely, the presence of enlarged sub-maxillary glands and a slight nasal discharge.

The autopsy revealed the peculiar markings on the lungs which were quite pronounced. The markings on the heart were not such as would impress themselves unless one were making a very careful examination. The spleen showed the petechial spots, the largest being about two millimeters in diameter. There were also petechial spots on the liver which were about one millimeter in diameter. The presence of these spots on the liver was not mentioned in the paper of Hunting, nor have I seen mention of a similar condition elsewhere. This case, however, is the only one in which this peculiar marking has been observed, and it is possible that the large amount of mallein injected may have been responsible for its appearance.

The lesions other than those mentioned consisted of glanderous foci in the sub-maxillary glands, a few ulcers on the schneiderian membrane, together with a few glanderous nodules in the lungs. The liver was not involved in the infection, nor were lesions observed in other organs of the abdominal cavity.

A great many laboratory animals have been used in connection with the recovery of the causative agent, the bacillus mallei, and also in connection with the testing of various lots of mallein prepared. Much experimentation of a technical character has been conducted on this subject, which would be of little interest to this report, though it has nevertheless consumed considerable time in the laboratory routine.

I am able to present herewith a few photographs, showing lesions which are not usually met with in the ordinary field work on glanders.

One of these (plate I) shows the two testicles of a horse in which the disease had gained considerable headway through the incorrect diagnosis of the veterinarian in charge. In the case of this animal, the history indicates that the first symptom noticed was connected with the serving of mares, which would imply the involvement of the testicles early in the disease. At the time he was destroyed the disease was generalized, there being ulcers on various parts of the body of an indolent character; with farcy buds on all four legs. Arsenic was given in large quantities, and for a time beneficial results were said to have been produced, but these lasted for a limited period only. There had been a nasal discharge from time to time; this, however, was very slight at the time of killing the animal.

The autopsy revealed lesions of chronic glanders, and laboratory animals inoculated with portions of the lungs and with the pulp of the testicle developed the acute disease in a generalized form.

The second photograph (plate II) shows lesions of a chronic character on the schneiderian membranes of two animals. That showing the greatest ulceration and

*N.B.—The photographs referred to above will be found in the monograph form of the report.

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almost complete destruction of the septum nasi was taken from a horse which, as near as can be ascertained, was one of the original sources of infection in the Ottawa outbreak. This animal was not found until just after it had been killed, and by tracing back it was found that he had been in contact with many other animals which were later destroyed, the majority of which showed clinical symptoms.

The scars of a partially arrested case are particularly well shown on the other septum nasi in the same photograph, and are of interest as indicating the condition present in what many consider a cured case of glanders. In this instance active infective material was found in the lungs, which destroyed guinea pigs with characteristic symptoms and lesions.

The photograph of the larynx (plate III) opened from behind shows scars in the trachea, and is from the same case as the septum nasi showing scars on the schneiderian membrane.

MALLEIN.

During the past year there has been dispensed at this laboratory 3,382.5 cubic centimeters of mallein, a sufficient quantity to test 1,353 horses. This mallein (with the exception of 345 cubic centimetres, a sufficient quantity to test 138 head of horses, prepared by myself at this laboratory) was obtained from the Chicago office of the Pasteur Institute, through the office of the Chief Veterinary Inspector.

Much experimental work has been conducted in connection with the preparation of this product, with the result that little difficulty is experienced at the present time in its manufacture.

PECCOR CATTLE DISEASE.

The investigation of this affection has revealed little or nothing of interest in addition to the work of previous investigators. A great many cultures were made from material furnished (pipettes from diseased animals) by W. H. Pethick, V.S., who conducted the field work. These cultures have invariably contained a various bacteriological flora; a form of the bacillus coli, appearing constantly, more particularly in the preparations taken from the liver and mesenteric lymph glands.

The lesions have in every instance been those described by Drs. Osler, Wyatt Johnston, and Adami. After perusing the official reports of these gentlemen, I am unable to make further additions to the microscopic appearance in the lesions of this affection. I agree with the later statement of Dr. Adami,* that the bacillus so frequently found in the mesenteric lymph glands is a form of the bacillus coli, and if it is connected with the affection in any way such connection is only incidental or secondary to some predisposing cause concerning which we are not fully informed at the present time.

It is my opinion that the disease has no infectious causative agent, but that it is the result in a great measure of local conditions. As to the exact local condition, I do not desire to express myself in detail, as it has never been my privilege to visit the district in which the affection is prevalent. From its history, and from the idea that the plant, *Senecio Jacobea*, is responsible, coupled with the existence of a similar affection in New Zealand, where the local idea is that the same plant is responsible, and the partial success of experiments conducted by Mr. Gilruth, M.R.C.V.S., Chief Veterinary Officer of that colony, in producing the disease by feeding this plant, would lead one to suppose that the direct or exciting cause of the affection was in some way connected with it.

The Chief Veterinary Inspector, Dr. Rutherford, has experiments under way at the present time, the aim being to determine if possible the cause of this affection.

*Adami.—Report of the Minister of Agriculture for the year of 1901. Page 132.
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HOG CHOLERA.

The subject of hog cholera was, during the first few months of the year, given considerable attention. Later, with the pressure of other work, investigations have been almost entirely discontinued, for the reason that if reliable results are to be obtained from such investigations, it is necessary for one to devote almost his entire time and attention to this one subject. This close application to the study of this disease 'requires a long series of experiments without interruption, and conducted by the same person,' as pointed out by Dr. D. E. Salmon, Chief of the Bureau of Animal Industry of the United States, in his report for 1901.*

There are at the present time quite a number of cultures from various outbreaks of hog cholera, which have been obtained from the material sent in for diagnosis and from that which has been forwarded by request of the writer (through the office of the Chief Veterinary Inspector), that the material might be at hand to conduct original work.

The importance of this work is the more forcibly demonstrated through the recent appearance of a circular† of the Bureau of Animal Industry, in which preliminary investigations are cited, giving data concerning ('a form of hog cholera not caused by the hog cholera bacillus'), and which is very closely related to it, both in its clinical symptoms and pathological lesions.

This new form of hog cholera is seen in the acute type, and is very fatal. It is communicable to hogs only, other animals being immune. Outbreaks of hog cholera caused by what is generally termed the hog cholera bacillus may be complicated by this newly described affection.

The sanitary regulations required to control outbreaks of this new form of hog cholera are identical with those necessitated in outbreaks caused by the *Bacillus Cholera Suis* of the Haemorrhagic Septicaemia group.

In undertaking the investigations on hog cholera, the main idea was to determine whether the '*serum diagnosis*' could be applied with certainty, and if so, its practicability for use in the field. This work in many respects has been rather discouraging, for in some instances the characteristic agglutination reaction could be demonstrated with little difficulty, and again when tried with serum from animals that at the autopsy revealed lesions, which were undoubtedly those of hog cholera, the results have been negative.

In my hands this means of diagnosis has never given the impression of being sufficiently reliable to enable it to be used in a practical manner, though with experimental laboratory animals, there has been little or no difficulty experienced in obtaining characteristic results with a dilution of 1:50.

In connection with this work I do not consider it advisable to undertake further investigations till such time when it will be possible to work, not only upon the usual laboratory experimental animals, but also upon diseased hogs. It is only by work upon the animals which are liable to contract the affection that we are able to eliminate errors in drawing conclusions as to the prevention and treatment.

I append to this brief statement on this subject photographs (plates IV, V and VI) of specimens showing lesions of the intestine common to hog cholera, in their various forms. These no doubt will prove of benefit to those who have never been unfortunate enough to suffer from its ravages. It will also render the diagnosis easier, should a reader at any time see the lesions.

A detailed description will be found in connection with the explanation of the plates.

* Salmon.—Eighteenth annual report of the Bureau of Animal Industry of the United States, 1901, p. 9.

† deSchweinitz and Dorset.—Bureau of Animal Industry. Circular 41. October 1st, 1903.

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CATTLE TICKS.

The laboratory services have been called upon in the identification of a cattle tick. This tick was taken from a lot of cattle which were shipped from Mexico, through the United States, to Canada. From the history of these cattle it appeared that they were possibly infected with the 'Boophilus Bovis' (Riley), the tick which transmits infection in Texas fever.

The tick in question was identified as 'Ornithodoros Megnini,' the 'Spinosa ear tick,' which is a harmless species.

DISINFECTANTS.

A sample of disinfecting material resembling creolin was forwarded for examination to determine its efficacy. It proved to be quite efficient. To publish at this time a statement concerning the same would be unjust to other manufacturers, who probably have articles which are equally efficient; therefore no details will be given in the present report concerning this matter, which has occupied considerable time.

HAEMORRHAGIC SEPTICAEMIA.

This disease while not having been actually identified as occurring in Canada, sufficient data has been obtained to indicate that its existence is, unfortunately, more than a probability. Much of the material sent in from the vicinity of Sherbrooke, Que., as suspected 'anthrax' has failed to reveal indications of this disease. The autopsy lesions as described by those making autopsies reveal the haemorrhagic nature of the affection. This haemorrhagic nature of the disease has been confirmed through material which has been received at the laboratory, and in similar preparations from which a small bacillus could be made out, but with which it was impossible to reproduce pure cultures or infect animals.

Later, with cultures furnished from a case upon which an autopsy was performed by Dr. A. W. Tracy, of Sherbrooke, Que., a bacillus has been isolated, which resembles, in the majority of its morphological characteristics, the *Bacillus Bovisepticus*. With this germ it has been impossible to infect either rabbits or guinea pigs.

I have received and am studying the peculiarities of a culture of *Bacillus Bovisepticus*, forwarded on request by Dr. F. F. Wesbrook, Director of the Minnesota State Board of Health Bacteriological laboratory, which was isolated from an outbreak of haemorrhagic septicaemia in that state. This germ kills rabbits in eight hours with characteristic lesions.

A full comparison of the two germs is not complete at the present time.

Steps have been taken to obtain material from diseased cattle in the vicinity of Sherbrooke, and it is hoped that the disease may be definitely identified, that advice can be given as to preventive measures, that they may be based on scientific facts.

This disease is not similar to that studied by the author in L'Avenir and Cowansville, Que., in the summer of 1899, as no haemorrhagic lesions were found in these cases. Also cultures from the various organs were negative.

ACTINOBACILLOSIS.

Actinobacillosis is a disease which has for many years been confounded with actinomycosis. The difference between the two affections was first pointed out by Lignieres and Spitz,* as the result of extensive investigations conducted in the Argentine Republic. The difference between their causative agents is indicated by their

* Lignieres and Spitz.—Actinobacillose. *Recueil de Medecin Veterinaire*. September 30, 1902.

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names. Actinobacillosis is caused by a bacillus; actinomycosis is caused by a streptothrix.

The possibility of our having the two diseases in Canada was first mentioned by Dr. J. G. Rutherford, Chief Veterinary Inspector, in his report of last year.

During the year just ended two cases have come under our notice, from one of which it has been possible to isolate a bacillus, which I am at present studying, with a view to determine its relationship with that isolated by Lignieres and Spitz. Guinea pigs and rabbits have died with characteristic symptoms and lesions.

A detailed statement cannot be made at the present time, owing to the incompleteness of the investigations under way; but it is hoped that these details may be published within a short period.

A photograph of the tumour from one of the cases is appended herewith (plate VII). A photomicrograph is also appended, showing the lesion, in which the tufts are clearly indicated (plate VIII).

LABORATORY PHOTOGRAPHY.

This subject may not seem in place connected with an institution of this character, but to those familiar with the routine work it is conceded that photographs of diseased animals, pathological specimens and microscopic preparations are of the utmost importance.

The only photographic work conducted at the laboratory is that of microscopic specimens. These photomicrographs give a means of accurately measuring microscopic objects and are easily preserved for future reference. The production of good photomicrographs is considered the most difficult branch of the photographic art, and as such it deserves special mention here. As a novice in the work, I am able to reproduce herewith a very good photograph of a microscopic object. In this connection I may state that the greatest difficulty was experienced in connection with these specimens of actinobacillosis, as the tufts were stained with eosin, a dye which is very difficult to impress on the most sensitive photographic plates.

The apparatus used is that of Zeiss, the light being furnished by a battery of four, fifty candle power acetylene jets, combined with a concave mirror and a single condensing lens. Using a greenish yellow screen, the average exposure is from twelve to sixteen minutes with the oil immersion lenses, and an amplification of one thousand diameters.

This portion of the work has proven very interesting, though the time has been very limited. It has, however, been impossible to pursue this work to the extent necessary for permanent records.

LABORATORY RECORDS.

The keeping of the records in connection with the various investigations under way, and also of the various routines of the laboratory, is of the utmost importance. Unless the information at hand is available it is worth little or nothing, as it cannot be found when wanted. Knowing the needs in this direction, I have ever had in mind, in establishing this institution, the necessity of having a complete record of everything that has been done from time to time. In the keeping of records I do not consider that they are of value unless complete at all times, which completeness removes the possibility of one losing any particular bit of information, or of leaving undone work which is of vital importance.

I deem this matter of keeping records of more than passing importance, knowing as I do from actual experience how hard it is to devise a system which will meet every particular, and which also leaves no loopholes for possible mistakes. This system, the details of which I am about to describe, has been evolved after hard study

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and experimentation. It is a result of experience, not only in this laboratory, but also that which has been obtained from observation and trial of the methods of other laboratories with which the writer has been connected or had the privilege of visiting. My system is not by any means without some disadvantages, as in any system difficulties arise which are very hard to overcome, but after nearly a year's trial I take pleasure in stating that it is very satisfactory. It is far superior to any which has previously been used by the writer.

This system is based on the well known 'card index' idea, but for the various records I have designed special cards for the original and for the cross records.

Without further details I will explain the figures which are fac-similes of the cards in daily use.

No. 1		DATE May 2, 1907		LETTER No.	
FORWARDED BY A. E. Moore, D.V.S.					
OWNER OF ANIMAL John Smith			P. O. Noblehouse		
LOT		CON.	TP.	PROVINCE Ont.	
SUSPECTED NATURE OF TROUBLE Hog Cholera?					
ANIMAL Young pig.					
HISTORY			AUTOPSY NOTES		
Live pig brought to the laboratory			Small ulcers in stomach.		
			Intestine congested.		
Pigs ailing for past two or three weeks. A number have died.			Spleen, liver, kidney, lungs and heart appear normal.		
(C. H. H.)					

Specimen Record. Figure 1.

The first of the specimen record cards is shown in figure 1.

The number which appears in the upper left hand corner is the most important feature of this card, as this number identifies everything in the laboratory connected with a given specimen. All jars and slides, as well as cultures from the particular case in question, bear the one number, and there is no time lost in hunting over the laboratory for the information desired, nor is it necessary to write labels giving the complete title of the material of an individual case. This numbering instead of writing out labels has been found to be an immense labour saver, and also saves time in finding given specimens in the event of further inquiry or investigations. The writer has tried having serial numbers for the different kinds of specimens, but the keeping of the records has been complicated, and the desired information could not be obtained with facility when desired.

My method does away with the conflicting of numbers, and gives uniformity to the work, which is an essential feature.

Information as to the date of the arrival at the laboratory, the letter number, by whom it was forwarded, the owner of the animal with his post office address, and also the exact geographical location from which the material was obtained is seen at a glance. Space is given for the suspected nature of the trouble, and also the species of animal from which the material in question was taken. There are also

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spaces for the history and autopsy notes. These two latter spaces may seem to be very small, but in actual experience it has been found that there are but few cases in which there is not ample room for a brief resumé of the case. Should there be more than can be placed on the portion of the card allotted to the purpose, one can easily use an ordinary record card, placing the number of the material in question in the upper left hand corner for the purpose of identification, filing it in the cabinet immediately behind the regular form, and it is always available. If this course is not desired the number of the letter is always in sight on the face of the card, and can be referred to in an instant.

NATURE OF EXAMINATIONS MADE	REPORT 1903
	LETTER No. 146
Cultures from spleen, liver, kidney and blood.	
Cultures sterile after six days incubation.	
Diagnosis:	
Not Hog Cholera.	

(Reverse) Specimen Record. Figure 2.

The reverse of figure 1 is shown in figure 2, and provides for a full statement of the examinations made, whether they be macroscopic or microscopic, with their results. The date of making the report is designated, also the 'letter number,' which refers to the page of the laboratory letter-book.

In the routine, a card is filled out on the receipt of material, and is not filed in the cabinet till the case is dealt with and a report rendered. In making the report any one who has had experience will see what a convenience it is to have the whole of the data in such a small space, and not distributed on a number of pages in a temporary laboratory note-book. This card, which is a permanent record, is the original, and there is no possibility of making mistakes during copying as no copying is required.

In filing the record I have another card which enables me to refer to the name of the individual from whom the material was obtained, as can be seen in figure 3. Under the heading 'report' it is the practice to place a + or — sign, this being the simplest method of recording the result. I also enter on a similar card the name of the inspector or person forwarding the specimen. These cards are filed in the cabinet alphabetically, and can be referred to in an instant if an inquiry is made.

NAME	John Smith.				
ADDRESS	Noblehouse, Ont.				
Specimen Number.	Date received.	Animal.	Suspected Trouble.	Report.	Letter No.
1.	May 26/03	Young pig	Hog cholera		12

Specimen Record. Figure 3.

Tuberculin Record.—The record giving the amount of tuberculin sent out from the laboratory is kept on cards similar to figure 4. These cards are of salmon colour

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to distinguish them from other records. This card gives space for the name and address of the party to whom the material is sent, also the date, minims and dosage. In referring to the amount sent to a certain individual, one has only to turn up the card in the cabinet, and at a glance can see the dates and amounts forwarded. This form has been found particularly convenient, as inquiries by telephone from the office of the Chief Veterinary Inspector are frequently received concerning the amounts sent to inspectors. The small space occupied by the information allows the complete record to be carried to the telephone without inconvenience.

NAM.

Tombston Record. Form No. 5.

Address—

Tuberculin Record. Figure 4.

In a ledger system, no matter how complete, it would be necessary to copy from the ledger this information before giving the same over the telephone.

Animal Records.—These cards, as shown in figure 5, are designed for keeping the records of inoculated experimental animals.

The card is made out at the time of inoculation, and is kept in a small tray in the animal room. The various data are recorded daily, or oftener, as the case in question may require, by the attendant. The card upon the death of the animal is placed with the animal, and at the autopsy the findings are immediately recorded, after which the card takes its place in the cabinet, forming an original, permanent record. There is an advantage in this; in having for the permanent record, the record which is the original, as mistakes may occur more easily where any other form is adopted.

This card is yellow in colour, which is a distinguishing feature.

The card used for mallein, to record the various shipments, is similar to that used for tuberculin, and need not be described in detail.

This completes the list of special cards which are in use at the present time, but no doubt as the work grows it will be found necessary to add new forms to meet the added requirements of the work.

In addition to the cards listed there are also the library record cards which are familiar to everyone who has had occasion to use an up-to-date library, and these need no explanation.

No.	CAGE	ANIMAL				
INOCULATED		DEATH IN	DAYS			
POINT OF INOCULATION:		CLINICAL RECORD				
		DATE	TIME	TEMPERATURE	WEIGHT	
INOCULATED WITH:						
AUTOPSY						
SKIN	SUBCUTANEOUS					
HEAD						
THORAX						
LUNGS	HEART	PLEURA				
ABDOMEN						
SPLEEN	LIVER					
KIDNEYS		INTESTINES				
BLADDER	GENITALS	MESENTERIC GLANDS				

Animal Record. Figure 5.

ACETYLENE GAS AND ITS ADAPTABILITY FOR GENERAL USE IN BACTERIOLOGICAL LABORATORIES.

The author, in his report,* upon the work conducted at the Public Health Quarantine Station, William Head, Victoria, B.C., mentioned the installation of an acetylene plant in connection with the equipping of the Bio-Chemic laboratory of that station. A fuller description was given in an article contributed to the *Centralblatt für Bacteriologie*† in 1901.

In the equipment of the present Biological laboratory, the question of gas supply necessitated the installation of an apparatus which would serve for all laboratory purposes, and give at all times plenty of gas, with which the various heating and lighting operations could be conducted. From the experience at the above mentioned quarantine station, and from experiments conducted by the writer, there was no hesitation in selecting acetylene as the gas, which would, to the best advantage, fulfil the requirements of this institution. Since first charging the machine on December 15, 1902, there has been little or no difficulty experienced, with one exception; this exception being, the carbonization of the burners which have been used under the various constant temperature appliances. This difficulty is now solved through the

* C. H. Higgins.—Minister's report. Department of Agriculture. 1900. Page 39.
† C. H. Higgins.—Acetylene gas and its adaptability for use in Isolated Bacteriological laboratories. *Centralblatt für Bacteriologie*, etc., XXIX Bd. 1901. No. 20. Page 794.

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invention of special 'turn-down' burners, which have, during the past two months, given perfect satisfaction.

It is of interest to take up this subject rather fully, that others who are about to establish laboratories may have the results of our experience with this gas, and thereby save themselves the annoyance of going through the experimental stages in which it has been necessary for us to participate.

To those who are not fully informed on the subject, it will be well to say a few words concerning the source of the gas and the machines which are used in its generation. For this purpose I can do no better than quote from the article in the *Centralblatt für Bacteriologie* above mentioned:—

'Acetylene gas is generated by bringing calcium carbide and water together; this causes a decomposition of the carbide, and we have slack lime deposited in the water with the evolution of acetylene gas, (C_2H_2). Calcium carbide, or carbide, as it is commonly termed commercially, is manufactured from powdered lime and coke or charcoal, thoroughly mixed, and subjected to a temperature of $3000^{\circ}C$. in an electric furnace. This high temperature causes a perfect chemical combination to take place, and we have as the product calcium carbide. This calcium carbide resembles dark granite in appearance, is very hard and will not burn. It is non-explosive, and can be handled with perfect safety. It is portable, convenient, clean and reliable, and can be obtained almost anywhere in unlimited quantities.

A study of such literature as I could obtain, consisting chiefly of advertising matter setting forth the merits of each particular machine, was very interesting, each advertiser claiming that the machine manufactured under his patents was superior to others. In this study it was ascertained that there were three main types, to one of which all machines belonged, the variation in the different styles being in the mechanical construction by which the same end was brought about, namely, the evolution of the gas from the carbide.

A description of the various styles would hardly be within the limits of this note, involving as it would many minor technical points of little importance. A brief description, however, of the three main types will be given, in order to convey the main idea in the construction of each.

First type.—A large quantity of carbide is placed in a receiver so arranged that it can be perfectly sealed; pipes lead to a gasometer for the conveyance of the gas, which gasometer varies in size according to the capacity of the machine. The gasometer on becoming relieved of its gas falls; when it has reached a certain level a valve is opened automatically, allowing a given amount of water to be sprinkled over the carbide in the receiver, whereby gas is generated, forcing the gasometer up to again lower as the gas is used. This operation is repeated as often as is necessitated by the use of gas until the carbide in the receiver is exhausted.

Second type.—In another form of machine the water and carbide are so arranged that the gas is generated by changing the level of either. This contact through a change of level produces the gas, which forces the water and carbide apart: till such time as the gas produced has been used and another supply is needed, when the water and carbide are again brought together.

Third type.—This form of generator, the one which I consider the most scientific and practical in its principle, is one in which by a mechanical arrangement the carbide is dropped into a large body of water. In this water the gas is evolved, rising to the surface, is collected and passes into a suitable receiver or gasometer. When the gas is used the gasometer falls, causing another charge of carbide to drop into the water, which operation is repeated indefinitely as required. This machine can be recharged while in active operation, as it is not necessary to open any portion, the carbide being supplied from the outside.

My reasons for considering this latter style of machine preferable to the others are as follows: In the first two mentioned, the heat evolved is liable to overheat the gas,

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or if the machine is doing more work than it should (which is very frequent in practice, the tendency being to procure a machine too small for the work required), it will get so hot that it is dangerous to work with it. Where the carbide is dropped into a large body of water there is never this danger of overheating. Again, in types one and two, the slaked lime will hold small portions of the carbide in its midst, preventing in this way its full decomposition, and thereby cause a loss of gas. In the immersion system, as this third type is called, there are fewer traps to be watched and kept full of water. In the first two types there is a waste, for whenever the machines need recharging it is necessary to open them, through which operation a certain amount of gas is lost.

In the immersion system the carbide is dropped into the water from the outside, but the traps are so arranged that none of the gas generated escapes into the outside air. It is never necessary to open the generating chamber of these machines for any purpose whatever. The generating chamber never being opened, there is therefore less danger of an explosion, it being a well known fact that a mixture of acetylene and air produces an explosive mixture of the highest type. Many accidents have arisen from the use of machines of the first two types from this escape of gas in the process of recharging, against which provision cannot be made.

Generators for the production of acetylene gas from carbide have improved greatly since the appearance of the article from which the above quotation is taken, and the immersion type is now adopted almost exclusively by all manufacturers. The first two types have been practically discarded owing to the difficulty experienced in designing them so that they fulfil the requirements of the insurance underwriters.

When placing the acetylene plant in the Bio-Chemic laboratory of the William Head Public Health Quarantine Station, Victoria, B.C., it was necessary to remodel the machine somewhat, that the Bunsen burners then manufactured could be used without difficulty, as they necessitated a constant pressure of gas that would raise a column of water four inches. At the present time there are Bunsen burners and hot plates which work with far greater satisfaction at the normal lighting pressure of the gas (two and one-half inches) than did the burners mentioned, with their special pressure.

The connections for lighting and heating in this laboratory are the same, it not being necessary to have an increased pressure to manipulate the Bunsen or hot plate burners now in use.

The burners used for heating the various incubators and constant temperature appliances are of the 'turn-down' lighting pattern, which have the advantage of not carbonizing when used on a less consumption of gas than their rating. The ordinary lighting tips have been found to work well in some instances, but for every burner that will work well a dozen may be tried that will carbonize within a week.

It is also necessary to have the adjustment of the gas regulators perfect, owing to the small amount of this gas required as compared with ordinary coal gas, it requiring but about one-sixth the amount of acetylene to produce the same effect. To obtain this adjustment it has been found necessary to redraw some of the glass work on the improved Reichert regulator, that the gas supply may be reduced and also that the mercury seal may be accurately closed through the change in temperature.

After making the necessary changes in the regulator, it is possible to keep the incubators within half a degree at all times, provided, however, the temperature in the room where the incubator stands does not reach too great extremes. The affinity of acetylene to mercury has led to no difficulty in these regulators, a number of which have been in use for very nearly a year's time.

At one time it seemed that the presence of phosphorus in the carbide, giving phosphoretted hydrogen at the burners, was going to cause considerable trouble, but after taking some of the pieces of apparatus apart it has been found that a deposit only is formed on the copper, which deposition ceases after a time, leaving the metal much thicker and heavier.

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In the use of this gas it is essential that it be supplied to the burners perfectly dry, and one of the best means of accomplishing this, is to add to the main supply pipe, just as it leaves the machine, a cylinder with removable port-holes, which may be filled with carbide from time to time. This carbide removes any moisture which passes the various scrubbers found in the machine, and is at the present time placed on the machine itself by many manufacturers.

Further than this drying, I do not consider it essential to have purifiers (provided the carbide used is of good quality) that will supply chemically pure gas.

On the whole, I consider an acetylene installation the best which can be made for general laboratory uses; as it supplies a gas which is suitable for the various heating and lighting operations required in an up-to-date bacteriological laboratory. It gives at all times an even pressure, which is an absolute necessity for the accurate running of incubators and other constant temperature appliances.

In closing this, my report, I desire to here express my appreciation of the manner in which the Chief Veterinary Inspector, Dr. J. G. Rutherford, has interested himself in the laboratory work. He has ever been ready to lend his assistance in making this Division of the Health of Animals Service more efficient, through the encouragement and advice offered from time to time.

I have the honour to be, sir,

Your obedient servant,

CHAS. H. HIGGINS,

Pathologist.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 17.

HEALTH OF ANIMALS.

(A. E. MOORE, D.V.S.)

OTTAWA, October 31, 1903.

SIR.—I have the honour to submit to you this my annual report for the year ended October 31, 1903.

GLANDERS.

During the year I have tested with mallein 181 horses, of which 80 reacted.

The total number destroyed was 46. Seven of these were destroyed from clinical symptoms alone; 24 as reacting to the mallein test and showing clinical symptoms of glanders; 9 were killed after the second test (these developed clinical symptoms between the first and second tests), and 6 at the third test, being those that did not show an improvement in their reactions.

Of the reacting horses that do not show any clinical symptoms of glanders I have tested : 32 twice, 47 three times and 4 four times.* If these retests are added to the number of horses tested, it represents a total of 264 tests made during the year.

*Some of the horses under my supervision were tested the second time by another inspector.

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The system that Dr. Rutherford has adopted in dealing with glanders has proved to be very satisfactory in the cases with which I have dealt. Twenty-eight horses that have reacted have in the application of two, three or four tests finally ceased to react, and to all appearances are healthy and useful animals. These are all branded, however, and are still under our supervision. Of these 28 ceased reactors, 6 ceased to react at the second test, and 22 at the third or fourth tests.

I have also under supervision other horses that have been tested two or three times which are likely to become ceased reactors.

This system has been very instructive in demonstrating the action of mallein on glandered horses, its apparent curative effect, and the different reactions obtained in different horses.

I have examined a large number of horses clinically, at the Ottawa market on market days, and have frequently visited the large hotel stables near the market; also many large stables in other parts of this city and in Hull.

TUBERCULOSIS.

I have tested 97 pure-bred cattle for export to the United States, 55 being from the province of Quebec and 42 from the province of Ontario. Eleven of these reacted, and were therefore permanently ear-marked and not allowed to be shipped.

I have tested 203 cattle which were not for export, 86 being in the province of Quebec and 117 in the province of Ontario. Nine of these reacted, and three were suspicious.

HOG CHOLERA.

I have dealt with three different outbreaks of hog cholera this year, namely, at									
Iroquois, Ont.... 1 farm, 15 hogs on premises, 13 infected, 11 died, 4 destroyed									
Sudbury, Ont. . .	3	"	75	"	73	"	64	"	11
Copper Cliff, Ont.	1	"	24	"	23	"	21	"	3
<hr/>									
	5	"			109	"	96	"	18

These outbreaks were not reported promptly to the department, and it will be noticed that a large number of hogs died before my arrival.

I also visited two farms at Sault Ste. Marie and two farms at Niagara Falls, where hog cholera had existed, for the purpose of inspecting the premises regarding the disinfection.

SUSPECTED HOG CHOLERA.

I also visited many farms where hog cholera was suspected to exist, but found sickness due to either injudicious feeding or to bad hygienic surroundings; usually both these conditions combined. Verminous bronchitis, intestinal worms, pneumonia, gastritis and enteritis were some of the diseases seen.

ANTHRAX.

On January 5 I visited Cap St. Ignace, P.Q., to investigate a disease in cattle, which disease I found to be anthrax. Eighteen cattle, nearly all cows, died within a few weeks in one locality on five different farms. These farms were all joining, and I am of the opinion that the disease was spread by means of the carcasses which were allowed to lie about. I ordered all carcasses burned, and the stables disinfected.

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BLACK QUARTER.

Three outbreaks of this disease came to my notice during the year, namely:

Lisgar, Que.....	1 farm	8 young cattle died
St. Hyacinthe, Que.....	1 “	3 “
Bryson, Que.....	2 “	8 “

I advised a change of pasture when possible, and the vaccination of the remaining young cattle with blacklegine.

SHEEP SCAB.

I have dealt with one outbreak of this disease. A carload of lambs bought at the Western cattle market, Toronto, in November, 1902, were shipped to Cayuga, Ont., to be fattened. A few weeks after their arrival the owner noticed a skin disease, and called in the local veterinarian, Dr. Brandreth, who suspected scab. I visited Cayuga in January, 1903, and found 203 lambs, nearly all of which showed symptoms of scab. Four very bad cases I ordered killed. Of the remaining lot some were killed and dressed on the premises, and the rest were successfully dipped.

MANGE IN HORSES.

I discovered two cases of mange in horses on the street in this city. I immediately quarantined them, and ordered the owner to treat them, and to disinfect the stable. They were very bad cases, but were finally cured, and the stable was properly disinfected.

TYPHOID INFLUENZA.

During the latter part of October it was reported that there was a disease among horses in the city of Kingston, Ont., and vicinity. Acting on instructions, I visited Kingston, and called on Dr. Nichols, V.S., with whom I visited several cases which he had under treatment. All of these presented the characteristic symptoms of typhoid influenza. The disease was quite prevalent in this section this summer. Dr. Massie, V.S., informed me, however, that this malady has prevailed here for some years.

A DISEASE RESEMBLING HAEMORRHAGIC SEPTICAEMIA IN CATTLE.

Acting on instructions, I visited the neighbourhood of Bury, P.Q., on September 9, for the purpose of making another investigation regarding the disease in cattle which made its appearance again this year. I performed a post-mortem on a cow that had recently died, but was unable to obtain reliable material for the pathologist. The lesions found certainly resembled those seen in haemorrhagic septicaemia. Dr. Higgins is still carrying on experiments with material furnished from this outbreak, but up to the present time the bacillus of this disease has not been identified.

I was informed by Drs. Tracy of Sherbrooke and Taylor of Sawyerville, who were present at this post-mortem, that these lesions corresponded with those found by them in cattle that died presenting similar symptoms previous to my visit.

CRACKED HEELS IN COWS.

In September it was reported that cattle at North Bay, Ont., were suffering from severe foot disease. According to the above information, I visited North Bay, and found the trouble to be due to cracked heels. There were a number of family cows affected which were pastured in one field, and by all appearances this condition was due to irritation from mud. A few other similar cases were reported to me by farmers in the vicinity of North Bay.

At the time of my visit nearly all the cows were recovering, the cracks healing usually without treatment. There were no deaths.

STOCK YARDS. . .

Acting on instructions, I visited and inspected the Canadian Pacific Railway stock yards at Fort William, Schreiber, North Bay and Mattawa. Some changes were found necessary for the better accommodation and comfort of stock. I am pleased to state that the company have carried out our suggestions in a very satisfactory manner. New yards have been built at North Bay, and the Schreiber yards have been put in a much better condition.

REGARDING THE PREVENTION OF FOOT AND MOUTH DISEASE FROM THE NEW ENGLAND STATES.

In December, on instructions from the Chief Inspector, I visited some of the ports along the boundary of Vermont, for the purpose of warning customs officers regarding the prevention of the introduction of foot and mouth disease into Canada from the New England States. I visited the following places: Lacolle, St. Armand, Frelighsburg, Abercorn, Mansonville and Cookshire. The officers at each of these ports were very willing to co-operate with our department. Extra precautions were taken to prevent the movement of ruminants and swine across the boundary at all points.

I have the honour to be, sir,
Your obedient servant,
A. E. MOORE,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 18.

(M. C. BAKER, D.V.S.)

MONTREAL, October 31, 1903.

SIR,—I have the honour to submit my report for the past year.

During the year there were inspected and passed for shipment at the Canadian Pacific Railway stock yards 84,583 head of cattle, and 29,079 sheep, distributed as follows :—

	Cattle.	Sheep.
November, 1902.....	5,687	4,410
May, 1903.....	10,055	805
June, 1903.....	10,910	3,063
July, 1903.....	14,775	2,974
August, 1903.....	15,840	6,017
September, 1903.....	16,542	4,341
October, 1903.....	10,774	7,769
Total.....	84,583	29,079

Of these 16,795 head of cattle were from the United States, and 65 from Mexico; all the sheep and the balance of the cattle, 67,723 head, were Canadian.

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There being no facilities for inspecting and marking cattle for export at Quebec or Three Rivers, cattle to be loaded at these ports are inspected and marked here, so as to admit of their being loaded on board ship on arrival. 6,199 head of cattle and 1,427 sheep included above were loaded at Quebec, and 152 head of cattle at Three Rivers.

During the year there were rejected as unfit for shipment 146 head of cattle and 49 sheep.

Most of these animals were suffering from lameness or injuries. Three were affected with actinomycosis (the smallest number in 25 years); 2 were blind; 4, emaciation and general unthriftiness, and 1 tuberculosis.

The number of cattle inspected this year is very much greater than in any previous year, and the quality of the cattle has been generally good, specially the cattle from Ontario during August, September and October; they were even better than those shipped earlier in the season, and all remarkably free from disease.

In the month of July, acting on instructions received from the Chief Veterinary Inspector, I visited St. Armand and Granby to investigate reported outbreaks of contagious disease among cattle, but found the disease due to local causes, and not contagious.

In September I tested one bull with tuberculin for export to the United States.

I have the honour to be, sir,

Your obedient servant,

M. C. BAKER.

Inspector.

The Honourable

The Minister of Agriculture,
Ottawa.

No. 19.

(CHAS. McEACHIRAN, D.V.S.)

MONTREAL, October 31, 1903.

SIR,—I beg to report that during the year commencing November 1, 1902, and ending October 31, 1903, there were inspected, found free from disease and shipped from the port of Montreal to Great Britain, 432 head of horses. Four horses were held back, viz., 3 suffering from strangles and 1 from influenza. During October of this year 64 head of horses were inspected, found healthy and shipped from this port to South Africa.

There were imported to Canada during the year via the port of Montreal, 288 head of horses, viz., 228 stallions, 59 mares and 1 gelding. All were inspected, and allowed to go forward to their destinations.

I have the honour to be, sir,

Your obedient servant,

CHARLES McEACHIRAN.

Inspector.

The Honourable

The Minister of Agriculture,
Ottawa.

No. 20.

REPORT OF VETERINARIAN INSPECTOR AT MONTREAL.

(B. A. SUGDEN, D.V.S.)

MONTREAL, October 31, 1903.

SIR,—I have the honour to report to you the number of cattle and sheep that have been inspected and passed for shipment at the Grand Trunk stock yards, Montreal, during the period extending from November 1, 1902, to October 31, 1903. The monthly shipments have been as follows :—

Month.	Canadian cattle.	U.S. cattle.	Canadian sheep.	U.S. sheep.
November, 1902.....	5,891		4,970	
May, 1903.....	7,237	7,753	547	963
June, ".....	7,275	6,334	3,339	
July, ".....	8,313	4,751	10,804	157
August, ".....	5,601	3,070	2,826	150
September ".....	5,900	1,784	2,925	148
October ".....	5,730	630	5,757	305
Total Canadian.....	45,947	24,322	31,168	1,723
Total United States.....	24,322		1,723	
Total cattle and sheep.....	70,269		32,891	

Included in the above figures are 320 United States cattle and 800 Canadian sheep inspected in Montreal and shipped at Quebec.

During the season 134 cattle and 85 sheep were rejected. With the exception of 4 cattle, suffering from actinomycosis, there was no suspicion of contagious or infectious disease, the rejected animals all suffering from sore feet or injuries received during transportation. Many of these made recovery, and were eventually passed for shipment.

I have the honour to be, sir,
Your obedient servant,
B. A. SUGDEN.
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 21.

(J. H. FRINK, V.S.)

ST. JOHN, N.B., October 31, 1903.

SIR,—I beg to submit my annual report in connection with this station.

Inspection of Live Stock for Export.

The number of cattle inspected for export was materially increased, owing to the British embargo against New England shipping ports. All animals were subjected to a close inspection. Any animal showing lameness or being any way foot-sore was not allowed on shipboard. The work of inspection during the greater part of the season was much facilitated owing to the anxiety and interest manifested by shippers, who were eager that nothing should go on board which might in any way militate against the trade. Complaint reached me in an official way that one steamship line had reported that injured and foot-sore animals had been allowed to go on board, and that it had become necessary to destroy these animals on the voyage through humane motives. The evidence submitted should have disproved the statements made. Considerable injury is not infrequently committed after the animals leave the stock yard, and in nearly every case undue haste and hurry is exercised in the loading of cattle. The cost of loading is a mere trifle in comparison with other cargo, as the animals walk or more frequently run on board under pressure. Four or five hundred cattle are frequently loaded in this way in an hour and a half or two hours. If they were loaded in a more moderate way, and secured by the head ropes in their places as quickly as placed on board, not leaving the whole shipment as a struggling mass, between decks, until such time as it is found convenient to tie them, it would be much better for the animals, and to the interests of all concerned in them. With the exception of a few cases of actinomycosis, and some suspected cases of mange in a carload of distillery bulls, there was no evidence of contagious disease in any of the cattle inspected. In regard to sheep: in several shipments animals were observed which gave strong evidence of having been affected with scab, and having been successfully treated; notwithstanding this, these animals were detained and slaughtered. These sheep were traced to the Toronto markets. Although there were no active symptoms of scab, it was thought desirable to have the stock cars containing these sheep cleansed and disinfected.

Total number of cattle inspected....	31,721
Total number of sheep inspected....	13,323
Total number of horses inspected....	99
Total.....	45,143

Of this number, 7,763 were United States cattle, and 1,201 sheep.

Two shiploads of cattle inspected here were afterwards loaded at Halifax, N.S., owing to vessel having sailed previous to arrival of stock.

The total numbers of animals rejected for shipment were 75 cattle and 56 sheep. Five cattle were rejected for actinomycosis; six were condemned for extensive skin disease (suspected mange); the remainder were condemned for lameness and injury. Three cattle died in the yards from intestinal disorders.

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I have again to call attention to the great prevalence of ophthalmia among sheep arriving at the stock yards for export during the winter months. The great majority of them are blind, or partially blind, and they must suffer a great deal, and with it loss in weight and general deterioration in value. Strangely enough, United States sheep, although travelling much longer distances than Canadian sheep, never have ophthalmia when unloaded. This may be accounted for in part by the fact that the bulk of the United States export sheep are cross-bred merinos, and in them the eyes are not prominent, and the skin on the cheeks and surrounding the eyelids is very loose and lying in folds, which may afford some protection. I am firmly convinced that a considerable loss is inflicted on the shippers of sheep from this cause, and there should be some remedy.

Export to the United States.

Twenty-five head of milch cattle were inspected, and tested with tuberculin, for export to the United States. Two animals were detained as suspicious, re-tested after being quarantined three months, and were found free.

Importation of Live Stock from Great Britain.

Cattle.—Five head of Galloway cattle were imported from Scotland, owned by Messrs. J. E. Cochrane and Wm. Martin, Winnipeg. These animals were detained in quarantine ninety days, and were discharged in good health.

Sheep.—Six head of Cheviot sheep imported by Mr. F. E. Caine, of Charlotte county, N.B., were quarantined fifteen days, and were discharged in good health.

Horses.—Eighteen horses were imported, and having been inspected and found healthy were allowed to proceed; the names of importers being:—

H. W. Husband, Winnipeg, (1) Thoroughbred.

J. Colquhoun, Stratford, Ont., (8) Clydesdales.

W. N. Montgomerie, Cookshire, P.Q., (2) Thoroughbreds.

Dalgetty Bros., London, Ont., (3) Clydesdales.

Wm. Mahar, Tilsonburg, Ont., (1) Clydesdale.

Wm. Agnew, Russell, Ont., (1) Clydesdale.

O. McBride, Qu'Appelle, N.W.T., (2) Clydesdales.

1902—Nov. 19.—One sheep, imported from State of New York, consigned to Dominion Express Company, and allowed to proceed.

Inspection.

An investigation was made into a report, alleging that symptoms suggesting foot and mouth disease existed among a herd of cattle in King's county, N.B. There was not the slightest foundation for such report, as the animals were found in good health.

I have the honour to be, sir,

Your obedient servant,

JAMES H. FRINK,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

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No. 22.

(WM. JAKEMAN, D.V.S.)

HALIFAX, N.S., October 31, 1903.

SIR,—I beg leave to submit the following statements of animals inspected by me during the past twelve months.

On instructions from the Chief Veterinary Inspector, March 13, 1903, I visited a farm at Grand Pré, N.S., and examined a herd of cattle for tuberculosis.

On receipt of letter from the Chief Veterinary Inspector, April 21, 1903, I visited a farm at Tracadie, N.S., and tested a herd of cattle for tuberculosis.

On instructions by telegram from the Chief Veterinary Inspector, July 4, 1903, I visited a farm at Aylesford, N.S., to investigate a disease. Found one heifer died of black-leg; had her carcass burned, and all necessary precautions taken to prevent the disease spreading.

Exports from Halifax to the following countries:—

	Cattle.	Horses.	Sheep.	Swine.
Great Britain.....	4,014	17	426	
Bermuda.....	15	60	736	3
West Indies.....	11	18	709	5
Newfoundland.....	3	1	18	7
United States..		1		
Total.	4,043	97	1,888	15

Importations at Halifax from the following countries:—

	Cattle.	Horses.	Sheep.
Great Britain.....	9	3	6
United States		12	
Newfoundland		1	
Total.....	9	16	6

I have the honour to be, sir,

Your obedient servant,

WM. JAKEMAN,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

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No. 23.

(ANDREW A. LECKIE, M.R.C.V.S.)

CHARLOTTETOWN, P.E.I., October 31, 1903.

SIR,—The following is a report of all live stock examined at this port for year commencing November 1, 1902, and ending October 31, 1903.

Statement of Animals exported.

	Horses.	Cattle.	Sheep.	Swine.
Total for Nov., 1902.....	17	96	309	
" " Dec., 1902.....		43	1302	
" " April, 1903.....		124	52	54
" " May, 1903.....	8	253	124	10
" " June, 1903.....	10	159	329	
" " July, 1903.....	3	269	403	
" " August, 1903...	3	104	297	
" " Sept., 1903.....	7	69	287	
" " Oct., 1903.....	9	14	556	
Total export for year.....	57	1,131	3,659	64

The importations were small.

One Standard-bred mare, imported by H. McLeod, Esq., from United States in November, 1902.

Six Suffolk sheep, imported by Lane Bros., from England.

This comprises a full report of work at this port.

I have the honour to be, sir,

Your obedient servant,

ANDREW A. LECKIE,

Inspector.

The Honourable

The Minister of Agriculture,
Ottawa.

No. 24.

(J. A. COUTURE, D.V.S.)

QUEBEC, P.Q., October 31, 1903.

SIR,—I have the honour to send my annual report of live stock imported into Canada through this quarantine station from November 1, 1902, to October 31, 1903.

During these twelve months we have received 245 cattle, 231 sheep, 124 pigs and 93 goats, being a total of 693 animals, against 438 cattle, 365 sheep, 94 pigs, 13 goats, a total of 913 animals for the corresponding period of 1901-1902.

There is a decrease for this year of 193 cattle and 137 sheep, and an increase of 30 pigs and 80 goats.

The various breeds of animals imported are represented as follows:—

CATTLE.

Shorthorns.....	184	
Ayrshires.....	36	
Holsteins.....	15	
West Highland.....	10	
	—	245

SHEEP.

Shropshires.....	72	
Rambouillet.....	47	
Hampshire Downs.....	29	
Oxfords.....	28	
Cotswolds.....	25	
South Downs.....	19	
Lincolns.....	7	
Leicesters.....	3	
Dorsets.....	1	
	—	231

PIGS.

Yorkshires.....	114	
Berkshires.....	7	
Tamworths.....	3	
	—	124

GOATS.

Murcienne.....	2	
Nubienne.....	1	
Maltaise.....	6	
Taggenburg.....	20	
Alpine.....	46	
Saanen.....	18	
	—	93

Total.....		693
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Out of the 245 head of cattle imported, 230 were for Canada and 15 were for the United States.

Out of the 231 sheep that came to this station, 128 were for Canada and 103 were for the United States.

Of the 124 pigs which entered into quarantine, 118 were for Canada and 6 were for the United States.

All the goats were for Canada.

I have the honour to be, sir,

Your obedient servant,

J. A. COUTURE,

Superintendent.

The Honourable

The Minister of Agriculture,
Ottawa.

No. 25.

(W. H. PETHICK, V.S.)

ANTIGONISH, N.S., October 31, 1903.

SIR,—I have the honour to submit a short summary of my work for the year ending October 31, 1903.

I have pleasure in stating that the general health of live stock in Prince Edward Island has been good, and that no contagious disease (except tuberculosis) has existed in the province during the year. Reported outbreaks of hog cholera were found, upon careful post-mortem examinations, to be diseases of a non-contagious character, and generally the result of improper care or feeding.

I regret exceedingly to have to say that Dr. Rutherford's personal investigation on the spot, as well as Dr. Higgins' examination of material from autopsies held by me, confirm my opinion, already known to you, that Pictou cattle disease (hepatic cirrhosis) exists in a limited area east of the town of Souris, in King's county. I have also reason to fear that the same disease is accountable for the loss of both horses and cattle near the town of Alberton, in Prince county. As I have had the privilege of discussing the subject with the Chief Veterinary Inspector during his several visits, and as he has very fully looked into the matter himself, it will perhaps be out of place for me to deal with the subject further than to say that the people of Prince Edward Island, together with their fellow sufferers, through this mysterious disease, in eastern Nova Scotia, are deeply interested in the exhaustive experiments decided upon by Dr. Rutherford, and which I trust soon to have in train at your experimental station at Antigonish, and I sincerely join with them in the hope that the true nature and cause of the disease may be discovered, so that preventive measures may be advised.

During the outbreak of foot and mouth disease in the New England States, the Chief Inspector stationed me at McAdam Junction, and intrusted me with the inspection of the quarantine regulations along the St. John river frontier, and I wish to express my thanks to the customs officers along the border for their energetic and kind co-operation.

During January and February I was engaged in dealing with an outbreak of hog cholera at Grand Pabos, Gaspé county, Quebec. We were fortunate in being

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able to stamp out the disease without much loss. I visited the locality again in May, and attended to the more thorough disinfection of some premises which the deep snow of winter had rendered impossible during my former visits.

I was much pleased to notice that in response to Dr. Rutherford's advice, the parish councils have prohibited the dangerous and unprofitable practice of allowing hogs to run at large on the highways and sea beaches.

My absence from Prince Edward Island during the greater part of the season, when cattle are usually shipped to foreign ports, will account for the limited number of examinations made by me, the inspector at Charlottetown doing most of the work.

On September 1, I received your letter, transferring me to Antigonish, N.S. My employment since that date has been chiefly the supervision of the various matters connected with the fitting out of the experiment station at Cloverville. Reports, in detail, of the progress made have been forwarded to you weekly.

I have the honour to be, sir,

Your obedient servant,

W. H. PETHICK,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa

No. 26.

(GEORGE TOWNSEND, V.S.)

NEW GLASGOW, N.S., October 31, 1903.

SIR,—I have the honour to submit my annual report to you for the year. There is very little I can add. Of the 136 cases, 89 were in Pictou and 47 in Antigonish county. The most of the Pictou ones were on the eastern border line. Taking Arisaig as a centre, 57 cases occurred within a radius of eight miles.

STATEMENT of cattle slaughtered and compensation paid from November 1, 1902, to October 31, 1903.

Month.	Number Slaughtered.	Amount paid.
		\$ cts.
November, 1902.....	8	61 00
December, 1902.....	4	14 66
January, 1903.....	3	15 00
February ".....	3	30 00
March ".....	6	50 00
April ".....	4	35 00
May ".....	11	93 33
June ".....	28	243 33
July ".....	36	303 66
August ".....	23	214 00
September ".....	8	56 00
October ".....	7	67 00
Total.....	141	1,182 98

I have the honour to be, sir,
Your obedient servant,
GEORGE TOWNSEND,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

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No. 27.

(V. T. D'AUBIGNY, M.V.)

TERREBONNE, QUE., October 31, 1903.

SIR,—I have the honour to submit to you my report of visits paid, inspections made and meetings held at the request of the Chief Veterinary Inspector, from November 1, 1902, to October 31, 1903. I have submitted to the tuberculin test 207 cattle. Of these, 5 gave a reaction. On March 5, 1903, I addressed a meeting of farmers at St. Ignace de Montmagny, Que., on the subject of infectious and contagious diseases, including anthrax and black-quarter. I made a number of visits to different farms to investigate the deaths of several animals, and in each case I explained to the owners how they should dispose of the carcasses of animals which had died of disease, and the precautions they should take. I also informed them of the provisions of the Animal Contagious Diseases' Act, 1903, which they admit to be a beneficial enactment.

I have the honour to be, sir,

Your obedient servant,

V. T. D'AUBIGNY,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 28.

(JOHN D. DUCHÊNE, D.V.S.)

QUEBEC, QUE., October 31, 1903.

SIR,—I have the honour to submit to you the following report of work done by me during the year ended October 31, 1903.

I have tested by mallein 29 horses, of which 15 horses have reacted; 11 have been destroyed; 3 cured by the injection of mallein, and 1 is on treatment, with good hopes of recovery.

I have the honour to be, sir,

Your obedient servant,

JOHN D. DUCHENE,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

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No. 29.

(PROFESSOR ANDREW SMITH, F.R.C.V.S.)

TORONTO, ONT., October 31, 1903.

SIR,—I have the honour to submit the following brief report on the health of the domestic animals in Ontario during the past year.

HORSES.

Influenza and strangles have occurred to some extent in the early part of the year, but not so much as last year. Two horses were found to be affected with glanders; they were destroyed, and the stables disinfected.

CATTLE.

There have been no evidences of enzootic and epizootic diseases among cattle. They have been generally healthy.

SWINE.

There have been one or two outbreaks of hog cholera in this locality, and several of hog cholera and swine plague in the western part of the province. These have been promptly dealt with.

I have the honour to be, sir,

Your obedient servant,
ANDREW SMITH, F.R.C.V.S.,
Chief Ontario Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 30.

(T. E. WATSON, V.S.)

NIAGARA FALLS SOUTH, ONT., October 31, 1903.

SIR,—I have the honour to report that very few diseases of a contagious character have occurred amongst the domestic animals during the past year.

Sheep scab made its appearance on one farm, and a few animals died or were in a dying condition when my attention was called to the matter, but by proper care and treatment it seems to have entirely disappeared.

During the months of May and June hog cholera made its appearance on four farms in the township of Stamford. I had all the hogs on these farms destroyed, and the premises thoroughly disinfected.

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The following animals entering Canada from the United States were inspected and quarantined during the past twelve months. They were all found healthy, and forwarded to their destinations:—

Cattle.....	127
Sheep.....	27
Hogs.....	28

I have the honour to be, sir,

Your obedient servant,

T. E. WATSON,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 31.

(GEO. W. ORCHARD, V.S.)

WINDSOR, ONT., October 31, 1903.

SIR,—I have the honour to submit my report of work done for the Department of Agriculture from November 1, 1902, to October 31, 1903.

In addition to performing my duties as superintendent of the animal quarantine station here, I have slaughtered hogs for hog cholera, inspected and quarantined farms for the same disease, and have inspected many carloads of animals for shipment. The following animals have been inspected by me during the year:—

FOR EXPORT.

Cattle.....	1
Sheep.....	7

FOR IMPORT.

Cattle.....	36
Horses.....	16
Sheep.....	1
Swine.....	6

I have the honour to be, sir,

Your obedient servant,

GEO. W. ORCHARD,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 32.

(ARTHUR BROWN, V.S.)

SARNIA, ONT., October 31, 1903.

SIR,—I have the honour to submit my report of cattle and swine received into the Ontario cattle quarantine at Point Edward, from November 1, 1902, to October 31, 1903. The swine imported were of good quality.

There have been no diseased animals in the quarantine this year, and I may state that no contagious disease exists in this district, with the exception of some cases of tuberculosis and actinomycosis.

The following is a statement of the animals received into quarantine; also cattle that were imported for breeding purposes that did not require to be placed in quarantine during this period:—

Cattle.....	41
Sheep...	224
Swine.....	19

I was instructed to visit a farm in the township of Adelaide, on September 29: Supposed outbreak of hog cholera. When I arrived 8 of the pigs were dead and buried, the symptoms being very much like cholera. I had the remaining hogs destroyed, and the farm placed under quarantine.

During the past eight months I have examined a great many stock cars coming from the United States, and have found the most of them in a satisfactory condition.

I have the honour to be, sir,
Your obedient servant,
ARTHUR BROWN, V.S.,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 33.

(J. H. TENNENT, V.S.)

LONDON, ONT., October 31, 1903.

SIR,—I have the honour to submit my annual report for the year ending October 31, 1903.

The first three months I had charge of the outbreak of hog cholera in Kent county. I was ably assisted by Drs. Perdue, Orchard, Kime and Thorne. During that time we had destroyed on 72 farms 2,584 hogs; held post-mortem on each hog; found 2,261 diseased and 323 in contact.

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November 9, received instructions to make farm to farm inspection of Camden township, to ascertain if hog cholera existed in the township. Assisted by Drs. Perdue and Orchard, we did so, and found no cases of hog cholera in Camden. I recommended that Camden be released of quarantine.

February 12, visited Drumbo to investigate reported cases of glanders. Tested with mallein five horses; all proved to be affected; had them destroyed and deeply buried. Had mangers, partitions and flooring of stable taken out and burned, the remainder of the stable cleansed, disinfected and white washed with lime, the harness cleansed and disinfected, and the place quarantined.

June 9, visited Pine river, in Huron county, to investigate outbreak of hog cholera. Had 387 hogs destroyed. Post-mortem revealed 289 diseased and 98 contact hogs. The disease was brought in a car of live hogs consigned from Essex county to Ripley station; a number of the sows were sold to farmers for breeding purposes, and in each case, with one exception, where they were taken hog cholera broke out, showing that the disease was of a virulent type. The different farms and feeding pens were placed under quarantine. No new cases have developed, and I am of the opinion that the disease is stamped out in this section.

June 13, visited Chatsworth to make inquiry about reported disease among cattle. After making full inquiry, and holding post-mortem, I am convinced that the disease is due to some local cause—either the feed or drinking water, or both.

June 23, visited Harrietsville. Found horse reported to have glanders. Used the mallein test, which showed that it was not affected.

July 7, visited Chesley, where it was reported that hog cholera had broken out. I held post-mortem, which proved that it was not hog cholera, but stomach and bowel trouble due to the character of the feed.

July 24, visited the Bruce peninsula to make inquiry regarding disease affecting cattle there. Found the disease to be epizootic ophthalmia; directed the owners how to treat them. In my opinion they will all recover, with the exception of about 8 or 10, which may lose the sight of one or both eyes. There were about 200 head affected.

July 30, visited Feversham. It was reported that horses on four farms in this vicinity were suspected of having glanders. Tested them with mallein. Three of the horses proved to have glanders. Had the three horses destroyed and burned, and the usual precautions taken as to cleaning and disinfecting the premises. The farms were quarantined.

During the year I tested with tuberculin 135 head of pure-bred cattle intended for export to the United States, 8 of which reacted.

The general health of stock in this district has been good, nothing except that contained in my report having occurred.

I have the honour to be, sir,

Your obedient servant,

J. H. TENNENT,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

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No. 34.

(WM. STUBBS, V.S.)

CALEDON, ONT., October 31, 1903.

SIR,—I have the honour to submit this my annual report on the inspection of cattle in the province of Ontario from November 1, 1902, to October 31, 1903.

Acting on the instructions received from the Chief Inspector, I have tested with tuberculin 186 pure-bred cattle for export to the United States, 4 of which reacted.

For particulars with regard to the foregoing, I beg to refer you to the detailed reports which I have from time to time forwarded to your department.

On December 17, acting on instructions, I visited two farms in the township of Mulmer, county of Dufferin, said farms being then under quarantine for hog cholera, the results of which I fully reported to the department at the time.

I have the honour to be, sir,

Your obedient servant,

WILLIAM STUBBS,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 35.

(GEO. W. HIGGINSON, V.S.)

ROCKLAND, ONT., October 31, 1903.

SIR,—I have the honour to submit to you my annual report for the year ending October 31, 1903.

During the year I have tested with tuberculin 81 pure-bred cattle for export, 2 of which reacted, and 223 cattle not for export, 29 of which reacted. I have also tested with mallein 2 horses; 1 reacted, and was immediately destroyed, another was placed under quarantine for forty days, when he was retested and gave no reaction. On October 8, I applied the mallein test to horses at Lachute, Que., but got no reaction.

During the year I gave fifteen certificates of health for animals being exported.

I have the honour to be, sir,

Your obedient servant,

GEO. W. HIGGINSON,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

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No. 36.

(W. W. STORK, V.S.)

BRAMPTON, ONT., October 31, 1903.

SIR,—I have the honour to submit my report for the year ending October 31, 1903.

INSPECTION OF STOCK YARDS AND DISINFECTION OF CARS.

Since taking office with your department I have regularly visited the market at Toronto, inspecting the stock, paying special attention to sheep and hogs about to be reshipped to the country for breeding and feeding purposes. A large sum of money is at present being expended on this market, and when completed the accommodation and sanitary arrangements will no doubt be much improved. I have also paid regular visits to the new market, known as the 'Union Stock Yards,' Toronto Junction, which has recently been opened for general business. The facilities for handling stock and the sanitary equipment are first class. I have spent considerable time looking after the disinfection and cleaning of cars at different points, and am able to report that the railway companies are executing this important duty in a more systematic way than formerly.

DISEASE IN HOGS.

I have made a large number of investigations where disease in hogs was reported, and a large percentage turned out to be caused by injudicious feeding, the practice of feeding buckwheat to young hogs being a common cause of intestinal derangement. I have to report the outbreak of cholera at Toronto township, Peel county, Etobicoke township, West York, Gwillimbury township, North York and Collingwood township, Grey county. Sections of tissue from suspected animals were in each of these cases submitted to your bacteriologist, and the presence of disease demonstrated. Prompt measures were taken, the animals slaughtered and cremated, and I am pleased to report that with one exception the disease was confined to the place of origin. The one exception was where a brood sow was shipped some two weeks prior to the outbreak, and on becoming aware of the nature of the trouble, and the shipment, I followed the case up, to find that the sow had succumbed shortly after her arrival, but not before having conveyed the contagion, which necessitated the slaughter of the hogs with which she had come in contact.

SCAB IN SHEEP.

I have to report having quarantined eleven contiguous farms in the township of Guelph, county of Wellington, owing to the presence of scab. The animals belonging to the different owners mingled with one another on the highway, thus accounting for the presence of the trouble on so many different farms. Repeated washing and dipping has had the effect of eradicating the trouble. Two other small outbreaks of scab, one in the county of Haldimand, and one in the county of Ontario, were also dealt with.

By orders from your department, I examined a number of Galloway bulls, purchased in Ontario for shipment to the Indian Department, N.W.T., and found them to be in good condition, and looking like thrifty animals.

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GLANDERS.

During the year I have dealt with two cases of glanders, one at Rockwood, Ont., and one near Oshawa, Ont. Both animals showed the characteristic symptoms of the disease, and reacted to the mallein test. They were both slaughtered, and their carcasses properly disposed of. In neither case was I able to account for the source of contagion.

I have the honour to be, sir,

Your obedient servant,

W. W. STORK,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 37.

(M. B. PERDUE, V.S.)

CHATHAM, ONT., October 31, 1903.

SIR,—I beg to submit herewith my annual report for the year ending October 31, 1903.

The disease most prevalent, and, in fact, almost the only infectious disease among animals in this district, is hog cholera.

During the year I have dealt with 75 outbreaks of hog cholera, involving the slaughter of 1,941 hogs. Drs. Whyte and Orchard, who were ordered to Chatham to assist me during the severeness of the outbreak, dealt with cases as follows: Dr. Whyte, 23 outbreaks, involving the slaughter of 689 hogs; Dr. Orchard, 25 outbreaks, involving the slaughter of 829 hogs.

The local inspectors, Drs. Kime, Thorne and Rowe, handled, under my instructions, 84 outbreaks, involving the slaughter of 3,084 hogs.

The total number of outbreaks was 207, involving the slaughter of 6,543 hogs.

In the county of Kent the following townships are under quarantine: Tilbury East, Harwich, Raleigh, Chatham and Dover, and out of this area the shipment of fat hogs for immediate slaughter was allowed from April 1 to October 31, 1903, subject to veterinary inspection.

During this time I inspected 118 cars containing 14,748 hogs. Dr. Whyte inspected 5 cars containing 723 hogs, and the following number of cars, 161, containing 18,839 hogs, were inspected by Drs. Kime, Thorne and Rowe, making a total of 284 cars, containing 34,310 hogs, all hogs being inspected before entering the cars.

In addition to this, the other officers and myself have placed a number of farms under quarantine on suspicion, and on a number of these disease developed; the others were released later, no disease being evident. I also, under instructions from the Chief Inspector, tested 14 cattle with tuberculin, of which number one reacted to the test, and tested 19 horses with mallein, 6 of which were destroyed through reactions and showing clinical symptoms.

In November, 1902, I was instructed to investigate the cause of disease among horses in township of Tilbury North, and diagnosed the case as typho-pneumonia. Last June I was instructed to investigate a suspected outbreak of foot and mouth

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disease reported to the Department of Agriculture by Dr. W. J. McLaren, Highgate, Ont., and found the disease affecting the animals to be simple aphtha.

In concluding my report, I am pleased to state that the outbreak of hog cholera the past season has not been so extensive as in the previous year. This is due to the fact that the present system of dealing with the disease is proving very effective, owing largely to the valuable suggestions received from time to time by letter, and personally from the Chief Veterinary Inspector, who during his frequent visits has become thoroughly acquainted with the condition of affairs in the infected district.

I have the honour to be, sir,

Your obedient servant,

M. B. PERDUE.

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 38.

(JOS. KIME, JR., V.S.)

CHATHAM, ONT., October 31, 1903.

SIR,—I have the honour to submit the following report of the work done by me during the past year from November 1, 1902, to October 31, 1903.

Hog cholera has prevailed in this district to a considerable extent, covering a large area of territory in the district under quarantine.

Cattle in this district are apparently healthy; no disease of serious nature exists.

The work performed by me for the department during the period above mentioned included the slaughter of hogs on 72 farms, the inspection of 80 carloads of hogs, and the inspection of 124 farms to ascertain whether cleansing and disinfecting orders had been carried out.

I have the honour to be, sir,

Your obedient servant,

JOS. KIME, JR.,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

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No. 39.

(J. R. THORNE, V.S.)

WALLACEBURG, ONT., October 31, 1903.

SIR,—I beg to report that during the year ended on October 31, 1903, there has been almost no disease among domestic animals in this district other than swine plague or hog cholera, which has occurred in nearly every month of the year. There have been outbreaks on 36 farms or other premises in the townships of Camden, Chatham, Dover, Sombra, and the town of Wallaceburg.

I have several times during the year visited Walpole Island, and have found conditions there about the same as they have been during the last year or two: that is, I have found no actual disease among the hogs, but on account of lack of proper care and the proximity of the island to the State of Michigan, I would recommend no change in the regulations.

I have also reason to believe that the farmers and hog raisers are not as prompt in reporting the outbreak of the disease as they should be, and thus allow many animals in a large scope of territory to become infected. I would therefore recommend a more careful investigation of the source of contagion, and an inspection of all farms in an infected district.

I have the honour to be, sir,

Your obedient servant,

J. R. THORNE,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 40.

(GEORGE H. BELAIRE, V.S.)

PEMBROKE, ONT., October 31, 1903.

SIR,—I have the honour to submit to you my report of work done for the Department of Agriculture from the time of my appointment in the month of June, 1903, until October 31, 1903.

During that time I have tested with mallein 48 horses, 25 of which reacted; 6 horses that presented well marked clinical symptoms of glanders, and which reacted to the mallein, were destroyed; 2 horses showing well marked clinical symptoms were destroyed without the application of the test, making in all 8 horses destroyed.

Nine places were placed under quarantine, 5 of which were recommended for release when I was satisfied that the places were thoroughly disinfected, and that contagious disease no longer existed; therefore there are at present 4 places under quarantine, and under close observation.

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I am pleased to state that with the exception of glanders no disease of a contagious character affecting horses or other domestic animals has come directly under my notice.

The public at large are quite alive to the seriousness of the disease glanders, and in every case have given me all the information and help to carrying out the orders of the Chief Veterinary Inspector.

The manner in which horses are handled and worked no doubt is accountable to a large extent for the prevalence of glanders in this locality. The great number of horses employed in the lumber camps are hired for the winter months from farmers and others in the Upper Ottawa district, and are congregated in crowded stables, where drainage and the sanitary conditions are not the best, and returning to their homes in the spring may carry with them whatever disease or infection they have come in contact with during the winter.

The following facts cover the history of the outbreak of glanders in this district last spring: Several lots of horses were shipped to Ottawa from Pembroke, and were found on their arrival to be affected with glanders, and on inquiry it was found that the horses came from the several camps above Pembroke. In almost every case I now have on hand the disease can be traced back to these animals. The stables in which these infected horses were housed as far as is known have been visited by me, and thoroughly disinfected where possible, and in one or two cases stables have been destroyed, so that all precautions possible for the safety of horses going into the woods this winter have been taken.

I have the honour to be, sir,

Your obedient servant,

GEO. H. BELAIRE.

Inspector.

The Honourable

The Minister of Agriculture,
Ottawa.

No. 41.

(CHARLES LITTLE, V.S.)

WINNIPEG, October 31, 1903.

SIR,—I have the honour to submit my annual report of inspections for the year ending October 31, 1903.

The following is the total number of animals imported from the United States:—

Horses.....	9,526
Mules.....	675
Cattle.....	3,175
Sheep.....	80
Hogs.....	395

I tested 36 head of pure-bred cattle for export, all of which were healthy.

The stock in Manitoba have been very healthy this year. A few small outbreaks of symptomatic anthrax have been reported, and a number of horses have died with what is known as swamp fever.

I have the honour to be, sir,

Your obedient servant,

CHAS. LITTLE.

Inspector.

The Honourable

The Minister of Agriculture,
Ottawa.

No. 42.

(P. A. ROBINSON, V.S.)

EMERSON, MAN., October 31, 1903.

SIR,—Herewith I beg to submit a tabulated statement, showing number of stock of different kinds inspected by me at the ports of Emerson and Gretna, for the twelve months ending October 31, 1903. The most of this stock belongs to settlers, and was destined to points throughout the Territories.

INSPECTION AT GRETNA, 1903.

Month.	Horses.	Cattle.	Mules.	Hogs.
November,—1902	22	5	1	
December "	3	1		
March,—1903	67	19	2	
April "	104	23	16	
May "	28	5		9
June "	29			
July "	9			
Sept. "	4			
Totals...	266	53	19	9

INSPECTION AT EMERSON, 1903

Month.	Horses.	Mules.	Cattle.	Sheep.	Swine.
November, - 1902	48		66		15
December "	4		10		
January,—1903	4				
February "					
March "	85	6	57	13	15
April "	57	2	80	12	2
May "	37		63		4
June "	125		247	17	
July "	102	2	2		
August "	25		23	6	1
September "	177		40		
October "	30		177		
Totals....	694	10	765	48	37

I have the honour to be, sir,
Your obedient servant,
P. A. ROBINSON,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

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No. 43.

(R. D. SCURFIELD, M.D.V.)

CRYSTAL CITY, October 31, 1903..

SIR,—I have the honour to submit to you as per annexed report the amount of stock inspected by me at the ports of Crystal City and Snowflake, for the year ending October 31, 1903:—

Horses, 872; mules, 2; cattle, 704; sheep, 29; swine, 116.

I have the honour to be, sir,

Your obedient servant,

R. D. SCURFIELD,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 44.

(W. LITTLE, V.S.)

BOISSEVAIN, October 31, 1903

SIR,—I have the honour to submit the following report of animals inspected by met at Deloraine, Man., and Killareny, Man., during the year ending October 31, 1903.

Animals inspected at Deloraine:—

Horses.....	660
Mules.....	5
Cattle....	408
Swine....	4

Of the above 233 horses were for sale; 427 horses, 408 cattle, 5 mules and 4 swine were settlers' effects.

Animals inspected at Killarney:—

Horses....	245
Mules..	5
Cattle....	154
Sheep.....	3
Swine....	11

Of the above, 38 horse were for sale; the balance and all other animals were settlers' effects.

I have the honour to be, sir,

Your obedient servant,

W. LITTLE,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 45.

(R. E. MONTEITH, V.S.).

KILLARNEY, MAN., October 31, 1903.

SIR,—I have the honour to submit the following report of animals inspected by me during the period from May 22 to September 14, 1903:—313 horses, 95 cattle, and 40 swine, all found healthy and of average quality. Of the above 144 horses were for sale; the balance of animals settlers' effects.

I have the honour to be, sir,

Your obedient servant,

R. E. MONTEITH,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 46.

COMMISSIONER OF NORTH-WEST MOUNTED POLICE.

(A. BOWEN PERRY.)

REGINA, ASSA., October 31, 1903.

SIR,—I have the honour to forward my annual report for the twelve months ended October 31, 1903, together with the reports covering the same period of the various veterinary inspectors, which give in detail the work performed by them.

Insp. Burnett, V.S.,	Macleod District.
Staff-Sergt. Mitchell, V.S.,	Regina District.
Staff-Sergt. Perry, V.S.,	Wood Mountain District.
Staff-Sergt. Richards, D.V.S.,	North Portal.
Staff-Sergt. Coristine, V.S.,	Maple Creek District.
J. C. Hargrave, D.V.S.,	Medicine Hat District.
Staff-Sergt. Johnstone, V.S.,	Coutts.
Staff-Sergt. Oliver, V.S.,	Cardston.
Staff-Sergt. Hobbs, V.S.,	Calgary District.
Staff-Sergt. Sweetapple, V.S.,	Edmonton District.
Staff-Sergt. Mountford, V.S.,	Prince Albert District.

My veterinary staff at present consists of Insp. Burnett, 14 Staff-Sergeants, and Dr. Hargrave, of Medicine Hat, and are stationed as follows:—

Ports of entry—Wood Mountain, North Portal, Coutts and Cardston.—A veterinary inspector at each.

Maple Creek.—Also a port of entry.

Medicine Hat.—Also a port of entry.

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Macleod.—Insp. Burnett, V.S.

Calgary.—Two at present. Work is very heavy during the season of cattle shipments, and, in addition, R. Riddell, V.S., has often to be called in to assist.

Fort Saskatchewan.—Includes all Edmonton District.

Prince Albert.—

Regina.—Four at present; and as a rule three are always out at work.

Dawson.—For Yukon Territory.

As you will see by the different reports, the work has increased largely during the past year. Formerly it was usual if a horse reacted to the mallein test to immediately destroy it, but for some time past, acting under instructions from the Chief Veterinary Inspector, a horse reacting to the test is not destroyed unless it also presents marked clinical symptoms. This of course entails a large increase of work on the inspectors, as many animals have to be tested several times at intervals, and results in much increased travel and extra vigilance both on the part of the veterinary inspectors and our men stationed on detachments where the quarantine regulations are to be enforced. One case is reported where a horse was tested six times, and reacted every time, but no clinical symptoms; but on the horse being destroyed, and a post-mortem held, glander tubercles were found in the lungs and in the glands within and without the thorax.

The entries of both horses and cattle at North Portal were large, and promise next season to be much larger. The horses brought in at this point were mostly of a superior type, the larger number being settlers' work horses. A large number of Mexican cattle were imported. Owing to the insufficient facilities at North Portal to handle or feed a large number of stock, I found it necessary to station a veterinary inspector at Velva, North Dakota, where there are large cattle yards. These Mexican cattle were found to be free from disease, and from reports so far received appear to be doing well, but it remains to be seen how they will stand the winter.

Since my last report I stationed a veterinary inspector at Cardston. The entries of stock amounted to 8,158 horses and 6,971 cattle.

The general health of stock has been extraordinarily good, particularly amongst cattle, a little mange in the west being really the only disease mentioned.

HORSES.

Glanders, I regret to say, is still very prevalent in some parts of the Territories, and there is an increase in several districts as compared with last year, but it must be borne in mind that there has been a large increase in the number of horses during the past year. It is a noteworthy fact that glanders is almost unknown amongst the range horses, and is most prevalent in the thickly settled districts.

To show how easily glanders may get into the best looked after stable, I would say I bought a remount in the west apparently healthy in every way. He was brought here, broken and ridden for a couple of months, and was never away from the post. The veterinary surgeon, going his rounds one day, noticed him coughing, and treated him for a cold. A few days after, while being ridden, he began to expel blood from one nostril. Examination showed well marked ulcers. On applying the mallein test great reaction was shown, foetid discharge from nostrils, and the swelling at point of injection was very large. He stiffened up rapidly and became very dull, and was destroyed. All the horses occupying the same stable, some twenty in number, were tested, but there was no reaction in any of them. The band from which this horse was purchased was examined by a veterinary inspector, but no trace of glanders could be found, and there has not been a case of glanders in that district for the past twelve months.

The outbreak in the Red Deer district reported last year has, I am glad to report, been almost entirely stamped out by Staff-Sergt. Sweetapple.

It is very satisfactory to note that not a single case of glanders has been reported in the Maple Creek district for the past year.

The greater number of cases of glanders have occurred in Eastern Assiniboia, 1,130 horses having been examined or tested. Of these, 319 were tested and quarantined, 91 were tested and destroyed, 16 were destroyed without test, 269 tested and no reaction, 435 were examined and found free from disease, and 96 are still in quarantine. Of these tested and quarantined, there were 25 that reacted to the first test of mallein; 15 of these not reacting at the second test were released; the remaining 10 reacted on the second but not on the third test and were released.

Edmonton district ranks next in the prevalence of this disease, there having been 81 horses tested, and 45 destroyed, 15 of these being in the Red Deer country. Five horses, which reacted on the first test, failed to react on further tests and were released.

Calgary district comes next, with 27 horses destroyed, and Prince Albert district follows with 25 and 6 still in quarantine.

Maple Creek, no cases. Medicine Hat, 10 horses destroyed and 1 still in quarantine.

Lethbridge, 3 destroyed; Macleod, 1 destroyed, and Wood Mountain, no cases.

At ports of entry no glanders was discovered, except at North Portal, which had 4 cases.

I beg to append a statement, showing the number of horses destroyed for glanders in each district, as compared with last year:—

District.	1902.	1903.
Eastern Assiniboia..	39	107
Maple Creek, W. A.....	1	nil.
Medicine Hat, W. A.....	21	10
Lethbridge, Alta..	nil.	3
Macleod, Alta.....	3	1
Calgary, Alta....	11	27
Edmonton, Alta....	17	46
Prince Albert, Sask.....	20	25
	112	219

Mange has increased amongst horses principally or nearly altogether in the west. Early in the year, this disease was found to exist in several bands of horses running west of Stair, on the north side of the South Saskatchewan river. Dr. Hargrave, under my instructions, arranged to have these horses, some 4,000 in number, rounded up, all affected animals, to be taken up and treated and none to be sold or shipped until the range was clear of this disease. The greater part of these horses were rounded up on June 25, and examined by Dr. Hargrave, who picked out 74 head as affected, two so badly that they were shot. Later on he isolated fifty more head, which with the 72 already quarantined, were treated and released by Dr. Hargrave in the latter part of July. It is estimated that about 100 mangy horses died on this range during the bad storm in May last.

At the present time, the fall horse round-up is being held in the district west of Stair and all horses collected will be thoroughly examined and report made as to their condition.

Considerable mange existed amongst horses in the Little Bow country. Insp. Burnett, V.S., visited the affected herds, quarantined them and gave directions as to treatment, with the result that the disease is practically stamped out in that district.

Staff-Sergt. Hobbs, V.S., reports mange in his district as on the increase, and has, during the past year been visiting quarantined herds. His last report states that horses belonging to five large owners are still being treated and are in quarantine.

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Mange was found in a herd of horses at Rosthern in the Prince Albert District, 162 in number, which had come from the Lethbridge District. They were promptly quarantined. Forty-three have been released and one hundred and nineteen are still in quarantine.

Edmonton District reports only seven cases of mange, which have been treated and cured.

Only isolated cases have appeared in other districts.

Anthrax.—Two cases were reported from the Edmonton district. The bodies were burned.

Typhoid and other fevers appear to have been very much less prevalent than last year, mention of very few cases being reported even from the Edmonton and Prince Albert districts.

There were no other diseases amongst horses that require special mention, the only one that caused any trouble or loss being strangles, which is always more or less prevalent amongst young range stock.

CATTLE.

Cattle have been wonderfully free from disease. Mange is by no means eradicated, but the general report is that it exists to a much less extent than in former years. Owners of cattle, as a class, are fully alive to the seriousness of the disease, and now without delay take up a diseased animal and treat it. Some of the larger owners have dipping vats, but the general rule is to treat by hand application. Amongst the shipments of export cattle 110 head were rejected for mange in the Calgary district, nine in the Macleod and Lethbridge districts, and five in the Medicine Hat district.

Veterinary inspectors have made, during the past season, systematic inspection of a large number of cattle in their respective districts, and though mange existed, it did so to a much less extent than formerly.

Insp. Burnett, V.S., at the request of the Chief Veterinary Inspector, went to Helena, Montana, to confer with the chief state veterinarians of Montana and North Dakota on the subject of the prevention and cure of this disease, and on his return proceeded to Ottawa to report to and confer with the Chief Veterinary Inspector.

Actinomycosis.—Insp. Burnett reports the almost total disappearance of actinomycosis on the western ranges, and I have heard but little of it from any point. Two head of cattle were refused entry at North Portal, being affected with this disease, and three rejected for export in the Medicine Hat district.

Tuberculosis.—Fifty-one head were examined and tested at the Experimental Farm, Indian Head, and four found affected.

One short horn bull (pure bred) was found to be affected.

Black quarter.—Some cases were reported from various parts of the Territories, but it was much less prevalent than in former years.

Ophthalmia appeared in the Edmonton district, and at some points in the Qu'Appelle valley. It is supposed to be caused by the pollen of some plant entering the eye while the animal is feeding, and appears to be merely temporary, no case of permanent blindness having come to my notice.

SHEEP.

Sheep have been mostly very healthy. The only report of scab was amongst two small bands in the Lethbridge district. They were all dipped, and eventually slaughtered for butchers' use, without having come into contact with any other sheep.

Tape worm.—Dr. Hargrave reports a large loss amongst some flocks from this disease, which had made such headway before being reported that treatment was

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nearly useless. The loss occurred chiefly among the lambs and ewes. After the green grass started losses ceased.

Poisoning.—Dr. Hargrave also reports considerable loss amongst sheep during the month of May last from eating the young ‘Death Camas’ plants, one rancher in one night losing about 150 head out of a flock of 2,000 sheep.

SWINE.

No disease has been reported from any point amongst swine.

STATEMENT of stock inspected for importation.

District.	Cattle.	Horses.	Mules.	Sheep.	Swine.	Rejected.	
						Cattle.	Horses.
N. Portal.....	47,280	13,214	419	139	559	2	6
Maple Creek.	3,129	3,370	21	8,269	.....	.....	.....
Medicine Hat.....	73	3,430	6	.....	.....	.....	.....
Coutts	6,971	8,158	16	7,919	174	.....	.....
Cardston....	6,089	3,578	.....	.....	.....	.....	.....
Wood Mountain.	Nil.	1,574	.....	.....	.....	.....	.....
Total.....	63,542	33,354	492	16,327	733	2	6

INSPECTED FOR EXPORT.

Owing to climatic conditions, cattle were not in as good shipping order this year as is usual, and this, combined with the low price offered, has very materially lessened the number of cattle shipped. The following total shows the number of cattle and horses reported as inspected for shipment:—

District.	Cattle.	Horses.	REJECTED.	
			Cattle.	Horses.
Wood Mountain. ....	.....	1	.....	.....
Maple Creek ...	4,232	.....	.....	.....
Medicine Hat..	3,013	711	8	2
Coutts.....	839	.....	.....	.....
Macleod....	8,707	2,931	9	.....
Calgary...	16,555	2,767	110	.....
Totals.....	33,346	6,410	127	2

INSPECTION FEES.

The amount collected from November 7, 1902, to November 5, 1903, was \$15,-113.43, which has been duly remitted to your department.

SALE OF BLACKLEGINE.

The sum of \$200 has, during the same period, been remitted as proceeds of sale of blacklegine distributed from here, and necessary outfits for administering same. A supply was sent direct from your department to Dr. Hargrave, who reports having sold same to the value of \$129.20, making the total sales to equal \$329.20.

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Taking everything into consideration, I consider the Territories have every reason to be satisfied with the general health of stock, as, with the exception of glanders and mange amongst horses and mange amongst cattle (to a much less degree than formerly), no other disease exists to any extent, and I am using every endeavour, with the loyal assistance of my veterinary staff, to stamp out both glanders and mange, and I am glad to say that, as a rule, owners of stock appreciate the seriousness of these diseases and aid the inspectors in every way in their power.

I have the honour to be, sir,

Your obedient servant,

A. BOWEN PERRY,

Commissioner, N.W.M. Police.

The Honourable

The Minister of Agriculture,
Ottawa.

MACLEOD, October 31, 1903

SIR,—I have the honour to submit herewith my annual report of work performed for the Department of Agriculture.

Apart from the outbreak of mange among horses ranging between the Old Man's and the Little Bow rivers, the general health of stock has been remarkably good. The outbreak of mange among horses referred to looked very serious for a time, but now I believe we have it under control and hope to have it thoroughly stamped out in a short time.

While cases of mange among cattle are occasionally met with, the disease is not nearly as prevalent as in former years.

A fact worthy of note is the almost entire disappearance of actinomycosis. I have only seen four cases this year, and those were evidently of long standing. I cannot account for this unless the cool wet summers of the past two years have been unfavourable for the development of the fungus.

During the month of May a very severe snow storm swept over this district, but cattle and horses on the range came through it much better than was thought at the time they would. Most stockmen were of the opinion that they would lose at least 25 per cent. Judging from my own observations, I am of the opinion that one per cent will cover the loss. The loss among sheep, I believe, was heavy; but what the number was, I have been unable to learn. The greatest loss was among stocker cattle being shipped into the country, a great number from Mexico, Manitoba and Ontario being near the end of the journey when a great storm struck them. I believe that fully 50 per cent of these perished.

I have the honour to be, sir,

Your obedient servant,

JOHN F. BURNETT,

Inspector.

To the Commissioner,

N.W.M. Police, Regina.

REGINA, October 31, 1903.

SIR,—I have the honour to forward this my annual report of Depot Division, for the year ending October 31, 1903.

Obviously when one reflects on the wide extent of territory included within the limits of the quarantine staff of this division and the enormous amount of work

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incident to a year's operation, a report of this kind is necessarily restricted to a mere synopsis of the work actually performed. Anything in the shape of an attempt at particularizing would be impracticable, hence a detailed statement is appended (not printed) which briefly includes the individual cases that have come under the notice of the officials of the department and the action taken in each. Suffice it to say that in every instance where the suspected existence of contagious diseases has been reported, the localities in question have been visited with the least possible delay and such action taken as the regulations called for.

It might be mentioned in passing, as worthy of note, that of the many contagious diseases to which domesticated animals are subject and which accordingly are brought more or less prominently before the notice of quarantine inspectors in the course of the season's operations, in this instance, and within the scope of this report, glanders and its concomitant farcy were the only diseases of a contagious character that have come under my consideration. But for some reason—and possibly to a large extent owing to the greater influx of outside horses than heretofore—these diseases have prevailed to an unusual extent during the present season involving localities widely separated.

Another cause that might be mentioned of the dissemination of this disease is the current practice of turning work horses out on the prairie for the winter. Naturally these animals trust to their own resources, and in this way congregate in considerable bands for mutual protection, thus (assuming the disease exists in any individual) furnishing the maximum facilities for its propagation. The following spring these animals are taken up by their respective owners, and later on, when it is too late to mend, the discovery is made that they have glanders among their horses.

In the vicinity of Qu'Appelle a somewhat serious outbreak of this disease occurred, and the loss of several horses was clearly traceable to the nefarious act, on the part of two individuals, of dealing off a diseased animal. Accordingly, an information was laid against the offenders before a justice of the peace for an infraction of the provisions of "The Animal Contagious Diseases Act," and though a conviction was not secured, nevertheless a salutary effect was produced on the mind of the community.

I have the honour to be, sir,

Your obedient servant,

W. MITCHELL, V.S.,

Veterinary Staff-Sergt.

The Officer Commanding

Regina District, Regina.

WOOD MOUNTAIN, October 31, 1903.

SIR,—I have the honour to forward you the annual report of work done for the Department of Agriculture for the year ending October 31, 1903.

I am pleased to be able to state that there have been no cases of glanders in the district, and all horses entered for duty here have received a very close inspection for this disease.

Black quarter has been much less prevalent than in former years, due no doubt to the more extensive use of preventive inoculation.

Mr. Thompson, of Elm Springs, had an outbreak of enzootic catarrhal conjunctivitis in his herd of cattle. The disease readily subsided on his changing the pasturage from the low lying meadows to the hills.

Mr. Mullett, of Little Woody, lost a considerable number of sheep last spring from anæmia, caused by the inferiority of the food supplies.

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Horses entered for duty here during the year have been of a little better class than formerly.

I would respectfully submit that the lowest duty on horses entered at the customs be \$12 a head. This would entail a much better class of horses being brought in.

I inspected during the year 1,574 head of horses for the customs. The inspection fees amounted to \$538.25.

One black Clydesdale stallion belonging to Mr. Hovermale, which he was taking over to Montana, was also inspected.

I have the honour to be, sir,

Your obedient servant,

F. PERRY, V.S.,

S. Sergt.

To the Officer Commanding,

Regina District, N.W.M. Police.

NORTH PORTAL, October 31, 1903.

SIR,—I have the honour to submit my annual report of work performed at this place for the Department of Agriculture during the year ending October 31, 1903.

The following number of stock have been inspected:—

Horses.....	13,244
Cattle.....	47,284
Mules.....	419
Sheep.....	139
Hogs.....	559

The inspection fees collected for the year amount to the sum of \$5,919.45.

The great increase, both in the number of settlers' and dutiable stock, manifests very clearly the rapid development of the North-west Territories, and all indications point to a relatively still larger increase during the coming year; provisions for the accommodation and facilities for inspection should be provided for accordingly.

It is satisfactory to report that the stock imported by the immigrants from the various states is of very good quality, more especially the horses, each settler I presume only bringing the best of his stock; this may account also for the comparatively few head of animals rejected from entering. These were rejected for the following causes: Four cases of glanders, two of actinomycosis and two of mange in horses.

During the great influx in March and April the settlers' stock suffered a great deal owing to the long delays, rough treatment on the railways, and scarcity of water, especially here, where settlers were fortunate to secure water at 50 cents per barrel.

There has been a large importation of Mexican and Texas cattle, of very good quality, with the exception of a few train loads; showing a strong strain of Hereford breeding. The Mexican horses were comparatively of a poorer stock. Owing to lack of accommodation most of the southern cattle arriving in train loads were inspected at Velva, North Dakota, where large commodious yards were built last year. There are no facilities here for feeding and inspecting large numbers of cattle. Practically all the settlers' stock are inspected in the cars, which are invariably crammed to excess. This renders inspection very tedious and imperfect.

The condition of stock in this vicinity is good, no contagious disease having been reported to me.

I have the honour to be, sir,

Your obedient servant,

S. C. RICHARDS, S.S., D.V.S.

The Officer Commanding,

Regina District, N.W.M. Police.

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MAPLE CREEK, October 31, 1903.

SIR,—I have the honour to submit this the annual quarantine report for Maple Creek district for the year ended October 31, last.

This district the past year has been unusually free from contagious disease in stock of all kinds, mange being practically the only disease existing, and this to a comparatively slight extent.

During the months of March, April and May last I travelled over the greater part of the district inspecting the stock wherever practicable, and gathering all information I could in regard to condition of stock generally, and made special reports of every trip at the time.

Mange, I believe to be becoming less prevalent in this district each year, due in a great measure to the fact that the stockmen recognize more fully the seriousness of the disease, and therefore keep close watch on their herds and begin treatment on first appearance of the trouble in nearly all cases.

Last winter was longer and more severe than in recent years in this district, and cattle came through it in rather poor condition, as a result of scarcity of feed.

A number of ranchers were compelled to turn their stock out before spring opened up in consequence of having run out of hay. Where this was necessary the stock fared worse than those which had not been kept up and fed at all.

Following the rather hard winter, there was a very bad storm of snow and cold rain in the latter part of May, which caused heavy losses in stock in all parts of the district. More especially was this the case with female stock, heifers and cows with calf succumbing in large numbers.

The past summer has also been unfavourable for stock, being cold and wet; consequently, stock are not in nearly as good condition this fall as in the past few years. This is obvious by a glance at the number of beef cattle shipped this season compared with former seasons.

Again, the demand for beef this fall is slight, and prices low; so taking everything into consideration, conditions are not altogether favourable to the rancher this year.

Horses and sheep came through last winter in good shape, but there was considerable loss in these as well as cattle in the May storm.

The demand for horses this season has been brisk and prices good.

Imports are considerably in excess of previous years in horses and cattle, and are of rather better quality generally.

Imports of sheep about the same as last year in number and of good quality.

I have been very careful in my inspections of stock imported and in no case have I found signs of contagious disease.

Following is list of stock inspected during year, comprising imports, exports and local shipments. Also statement of amount of veterinary inspection fees collected.

Imports, Maple Creek, year ended October 31, 1903:—

Horses....	3,370
Cattle....	3,129
Sheep.....	8,269
Mules.....	21

Exports—

Cattle.....	2,959
-------------	-------

Local markets—

Cattle.....	1,273
-------------	-------

Veterinary inspection fees collected, \$1,766.68.

I have the honour to be, sir,

Your obedient servant,

D. CORISTINE, V.S.

To the Officer Commanding,

N.W.M. Police, Maple Creek.

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COUTTS, October 31, 1903.

SIR,—I have the honour to submit herewith my report of work done for the Department of Agriculture for the year ended October 31, 1903.

I took over the duties from Staff-Sergt. Carter on May 1, having been transferred from Depot division, Regina. My report prior to the above date has been compiled from the records kept on this detachment.

The total number of stock inspected coming into Canada through the ports of Coutts and Pendant d'Oreille (the latter port being opened on July 31), both by settlers under free entry and importers, are as follows:—

Horses.....	8,158
Cattle....	6,971
Swine....	174
Mules.....	46
Sheep.....	7,919
Inspection fees collected, \$3,177.24.	
Total exports—cattle—839.	

I have the honour to be, sir,

Your obedient servant,

H. J. JOHNSTON, V.S.,

Vet. S. Sgt.

The Officer Commanding,

N.W.M. Police, Macleod.

CARDSTON, ALTA., October 31, 1903.

SIR,—I have the honour to forward the annual report of work performed by me for the Department of Agriculture for the year ending October 31, 1903.

There were inspected for importation at this place 6,089 cattle and 3,578 horses. No animals were inspected for export.

I have the honour to be, sir,

Your obedient servant,

E. C. OLIVER, V.S.,

Vet. S. Sgt.

The Officer Commanding,

N.W.M. Police, Macleod.

· E ' DIVISION, CALGARY, October 31, 1903.

SIR,—I have the honour to submit this my annual report of work done for the Department of Agriculture for the year ending October 31, 1903.

I regret to say that glanders has been on the increase in this district. This is work which is surrounded with a host of difficulties, especially where no compensation for animals destroyed exists the poorer settlers do not inform, and some of those who are better off also suffer from this short-sighted policy, and we are hampered in ascertaining the whereabouts and the origin of the disease.

Staff-Sergt. Sweetapple has been engaged in the Red Deer district for the past year, and informs me he has just about got the disease stamped out there.

Dr. Nagel, of Red Deer, has also assisted us a great deal in giving us information as to where diseased animals were.

In March Dr. Riddell discovered glanders in the Eau Claire Lumber Company here, and since then we have destroyed some 13 horses, and 7 more are under quaran-

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tine waiting a further mallein test. Some cases are also awaiting further testing in the Crossfield district.

Mange exists in the Okotoks and High River districts, but not to the extent of previous years. Wherever it has existed the animals have been treated. Mange amongst horses is on the increase, and several ranchers' herds are now in quarantine in this district:—

These animals have all been treated, and are progressing favourably.

A number of horses have died between here and Edmonton from what the settlers call 'Swamp Fever,' but I am of the opinion that it is from 'Typhoid Influenza.' I am pleased to say not nearly so many as last year.

The fees paid practitioners while performing the duties of veterinary inspectors are, I think, altogether too small for the services rendered, and it is oftentimes very hard to get the men we require to act in this capacity.

In May this year several thousand Mexican cattle arrived in this district. These animals I have seen several times this summer on the range, and I am pleased to report that they are in a healthy condition.

Attached lists of horses killed for glanders and stock inspected during year*

*Not printed.

I have the honour to be, sir,

Your obedient servant,

ARTHUR HOBBS, V.S.,

Vet. Staff-Sergt.

The Officer Commanding,
N. W. M. Police, Calgary.

CALGARY, October 31, 1903.

SIR,—I have the honour to report that during the past twelve months I have inspected for shipment 646 horses and 4,524 cattle, and found them all in healthy condition, free from any contagious or infectious disease.

I have the honour to be, sir,

Your obedient servant,

R. RIDDELL, V.S.

To the Officer Commanding
"E" Division, N.W.M.P., Calgary.

FORT SASKATCHEWAN, October 31, 1903.....

SIR,—I have the honour to request that you will forward to the Commissioner's office, Regina, the attached annual quarantine report of services performed for the Department of Agriculture for the year ending October 31, 1903.*

I have the honour to be, sir,

Your obedient servant,

C. H. H. SWEETAPPLE, V.S.,

Vet. Staff-Sergt.

To the Officer Commanding
N.W.M. Police, Fort Saskatchewan.

* Not printed.

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PRINCE ALBERT, October 31, 1903.

SIR,—I have the honour to forward the annual report of the work performed by me for the Department of Agriculture for the twelve months ending October 31, 1903, which is in detail on the accompanying form:—*

One hundred and sixty-two head of mangy horses were shipped into this district from Lethbridge, and I quarantined them shortly after their arrival, and they are all doing well under treatment, and forty-three head have been treated successfully and released.

Twenty-one head of horses were destroyed for glanders, and ten head yielded to the Mallein test, and are in quarantine. Four of the above horses have since been destroyed for glanders.

With the above exception the general health and condition of the stock in this district for the past year has been good.

I have the honour to be, sir,

Your obedient servant,

J. J. MOUNTFORD, V.S.,

Vet. Staff-Sergt.

The Officer Commanding

" F " Division,

Prince Albert.

No. 47.

(J. C. HARGRAVE, D.V.S.)

MEDICINE HAT, October 31, 1903.

SIR,—I have the honour to submit the following report for the twelve months ending October 31, 1903.

Number of cattle inspected and passed for shipment was 3,013 head, and the number of horses inspected and passed for shipment, 711 head. A statement of these inspections is appended.

Seven (7) head were rejected for mange and two (2) for actinomycosis.

Beef cattle were not finished as good as those shipped last year.

The number and classes of animals imported from the United States at this port of entry are here given: Horses, 3,430; mules, 6; cattle, 73. 172 head of the total were inspected free, and fees to the amount of nine hundred and seventy-five dollars and fifty cents (\$975.50) collected on the balance.

During the past twelve months 1,290 doses of black-leg vaccine (cord form) have been supplied, the sales amounting to one hundred and twenty nine dollars and twenty cents. The demand for this preventive was not so large as last year, although owners testify to the great efficiency of the vaccine in reducing losses from black-leg to a minimum. Only one report of black-leg this summer, and the owner vaccinated with good results.

Glanders.—During the year ten (10) horses were shot, as against 21 horses in 1902, and 43 horses in 1901, showing that glanders is not so prevalent. Number of horses in quarantine at this date, one, it having reacted to mallein. A buckskin horse in quarantine for 15 months received six injections of mallein during that time and was then killed, having continued to react. On post-mortem, glander tubercles were found in the lungs and the glands within and without the thorax.

Mange.—During February and March mange among cattle was prevalent, some ranchers having their herds infected to the extent of ten per cent. It disappeared as

* Not printed.

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soon as spring opened up, and no indications of it were seen during the summer, but as soon as the cold weather commenced a few cases developed, but only one case was seen at the shipping yards. In April I discovered psoroptic mange in the range horses on the north side of the Saskatchewan river, since when energetic steps have been taken to stamp out the disease, but with what results cannot be ascertained until the spring round-up.

At the spring round up of horses, out of about 3,000 head gathered some 75 head were affected. These were held separate until cured. The ranchers state that they also gathered a number during the summer that developed the disease after the round-up. The fall round-up is working now, and when finished the herd will be inspected. The riders state that very little is showing now.

The most gratifying results in the treatment of mange were obtained from the perchloride of mercury; and lime and sulphur also gave good results.

Texas Fever.—In June and July two bands of Mexican cattle were quarantined and inspected for the Texas fever tick. These cattle came from Mexico, and it was reported that several of these ticks were found on these cattle. They were inspected, both in the yards where unloaded and out on the range. Quite a number were thrown and examined, but no evidence of the tick was found. On the other hand, every animal thrown was found to be infected with the spinous ear tick, called *Ornithodoros Megnini*. The stock yards at Stair through which these cattle passed were disinfected.

Tape Worm in Sheep.—The loss of sheep from this cause during the past winter was very large, almost every rancher suffering large losses, this loss being principally among the lambs and ewes, although a few wethers were also lost. The winter was well on before the ranchers reported this loss and asked for an investigation, and the sheep were so badly affected that very little could be done. The number of worms found in an individual sheep varied; as many as 150 were found, and were from 2 inches to 2 yards in length. In treating them several drugs were tried, and those that were not already weakened too much seemed to derive some benefit from some of them. Turpentine proved to be dangerous in the hands of the shepherds, as they would administer it too rapidly, and quite often the sheep died in their hands. Areca nut, sulphate of iron and salt, was used by some, and they reported that at once the sheep seemed to improve. Kamala was also tried along with their salt, but it was noticed that they did not take much of it, and to what extent these remedies will help cannot be determined until this winter when the sheep come into their winter quarters, when these drugs will be used more extensively. The green grass when once it started seemed to help them, and no more were lost.

Poisoning.—During May a number of sheep were poisoned by eating the young Death Camas plants, one rancher losing about 150, out of a herd of about 2,000 in one night. Powders of potassi permanganate and alum were given in a drink as an antidote, and when used in time saved nearly every case.

No *ophthalmia* among cattle was seen or reported this summer, and not a case of *tuberculosis* came to my notice.

I have the honour to be, sir,

Your obedient servant,

J. C. HARGRAVE,

Inspector.

The Honourable

The Minister of Agriculture,
Ottawa.

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No. 48.

(A. G. HOPKINS, B. Agr., M.D.V.)

VANCOUVER, B.C., October 31, 1902.

SIR,—Herewith I beg to present my report for the year ending October 31, 1902.

After returning from service as veterinary quarantine officer in Great Britain, I was stationed at Ottawa for some months assisting in the work of the veterinary branch. I was employed testing with tuberculin and mallein, assisting in the suppression of outbreaks of glanders, inspecting farms in Western Ontario quarantined for hog cholera; also inspecting the stock yards at Schreiber and North Bay, Ont., on which matters reports were made at the time.

In April last I was directed to proceed to Vancouver, B.C., for duty as inspector via the Crow's Nest Pass route, and to report on the conditions governing the carrying out of inspections and quarantine at the various ports along the boundary line.

I was recommended to call on the various customs officers en route as well as the officials of the branch engaged in work in the part of the country traversed. These instructions were followed and a report made to the Chief Veterinary Inspector. I arrived here the latter end of May and assumed charge of the duties formerly performed by Dr. J. B. Hart and Mr. Bland, V.S.

A change made by authority of your department since I assumed charge here, is the cessation of inspections on Canadian live stock for Dawson, Y.T., on which fees had been collected heretofore.

An outbreak of hog cholera in the Metchosin district, Vancouver Island, was reported to me by the Chief Veterinary Inspector, who instructed me to proceed to Victoria and co-operate with Dr. Richards in stamping out the disease, which was done, and reported upon. Later in the summer I was ordered to proceed to the boundary country to investigate an outbreak of glanders reported by Dr. J. A. Armstrong, which fortunately proved to be less serious than reported.

In addition to doing inspection work at Vancouver, I have also to make inspections at the following ports, viz.: Sumas (Huntingdon), Abbotsford, and Douglas (Blaine), and also at New Westminster. Having had my attention drawn by the Chief Veterinary Inspector to an outbreak of seab in imported sheep, occurring at Sunbury, I beg to call attention to the laxity and practical inoperativeness of the customs regulations governing the entry of feeding sheep and those for immediate slaughter. As will be seen from the correspondence with the department and the certificates submitted, sheep have been admitted on certificates issued by persons other than those authorized to be accepted by this branch. I am of the opinion that the only feasible method to attempt to keep out such disease is to insist on inspection of all sheep imported from the States to the south, and do away with a regulation requiring slaughter within ten days and no change of ownership, a regulation that has been constantly and repeatedly broken.

The facility for inspection or quarantine at the ports under my charge are not at all satisfactory. I would also again draw attention to the Canadian Pacific Railway stock yards here, which are in need of improvement.

My attention was called to suspected cases of glanders by Dr. Hart. I was enabled to confirm his diagnosis, had the clinically affected horses (2) destroyed, and have under observation and control the remaining horses owned by the firm. I have also made subsequent tests with mallein, as is now required by the Chief Veterinary Inspector.

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In the matter of red water, I have as yet had no opportunity of studying a genuine case, and so far have only been able to gather information regarding this disease from farmers. Mr. Sharpe, of the Experimental Farm, Agassiz, has kindly placed at my disposal all the information he had regarding the disease.

The prevailing opinion here is that the form of the disease seen in British Columbia is due to the cattle eating the fern or bracken (*pteris aquilina*, var. *lanugiosa*). The opinion has been advanced (*vide* report Dr. J. B. Hart, D. of A., 1902, p. 128) that the disease is due to a malarial agent. All persons furnishing me with information on this subject are a unit in saying that the disease is not found on the low lands, where fern is not present, but is prevalent on what are termed fern ridges. Farms adjacent will show marked difference in the freedom from or affection with the disease of the cattle carried on those farms.

I would suggest in regard to this disease (red water) that two or more healthy cattle preferably cows, in milk, be secured, and that arrangements be made to feed with a view to determining the effect fern has on the constitution and organs of cattle, and that a test may be made of the fat content of the milk by means of the Babcock test. By so doing data might be got which would either fix or exonerate from blame fern as the cause of the disease, and at a moderate cost, and might thus save an investigation more or less costly and incomplete without the facilities, only to be had in a first-class biological laboratory.

Reports of the number of animals inspected, together with the fees collected have been forwarded to your department from time to time.

I have endeavoured to cultivate an acquaintance with the live stock breeders of the province with a view to mutual assistance.

I desire also to mention the cordial assistance afforded me in the carrying out of my duties by the Collector and the Surveyor of Customs at Vancouver, the Collector of Customs at New Westminster and the sub-collectors of Customs at Douglas, Huntingdon and Midway.

I have been fortunate in securing the co-operation of the officials of the provincial department of agriculture when needed, and desire here to testify to the promptness with which Dr. Hart has attended to the duties assigned to him.

I have the honour to be, sir,

Your obedient servant,

A. G. HOPKINS.

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 49.

(C. R. RICHARDS, M.D.C., V.S.)

VICTORIA, B.C., October 31, 1903.

SIR,—I beg to submit herewith my report of the inspections of live stock made by me at this port for the twelve months ending October 31, 1903.

There has been a total importation of 90 horses, 4 mules, 54 cattle and 335 sheep.

During the same time there have been exported to the United States 17 horses and 2 mules.

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The horses were chiefly for light delivery and general purpose work.

The cattle consisted of 11 head of pure-bred Jerseys, imported for breeding from Oregon and Washington, and the remainder a mixed lot intended for dairying. They were all subjected to the test, and passed the same successfully, with the exception of one, a pure-bred Jersey. This one reacted to the test, and was afterwards destroyed with the consent of the importer.

The sheep were all imported from San Juan Island, and entered at Sidney, a sub-port of Victoria.

I have the honour to be, sir,

Your obedient servant,

C. R. RICHARDS, V.S.,

Inspector.

The Honourable

The Minister of Agriculture,
Ottawa.

No. 50.

(J. A. ARMSTRONG, V.S.)

NELSON, B.C., October 31, 1903.

SIR,—I have the honour to submit to you this, my report, for the year ending October 31, 1903.

During the year there was an outbreak of hog cholera at Greenwood, B.C., in which 93 animals were involved. There was also an outbreak of glanders on Rock and Anarchist mountain, in which five horses were slaughtered.

Following is a statement of stock imported into this district during the year:—

	Horses.	Cattle.	Sheep.	Swine.
November, 1902.				
December	59			
January, 1903.				3
February	100			
March	5	2		5
April	44		280	
May	79	22	872	
June	223		719	
July	230	30	729	
August	182	1	1,590	
September	59	38	466	
October	34	8		2
Total.	925	101	4,656	10

I have the honour to be, sir,

Your obedient servant,

J. A. ARMSTRONG,

Inspector.

The Honourable

The Minister of Agriculture,
Ottawa.

No. 51.

(W. S. BELL, V.S.)

CRANBROOK, B.C., October 31, 1903.

SIR,—I have the honour to submit my annual report for year ending October 31, 1903, at ports Gatway, Cranbrook and Rykerts.

I am pleased to state that the stock passed at these ports was all in healthy condition and from northern Montana, Idaho and Washington; mostly belonging to settlers, and of a very fair quality.

I am also pleased to report that no outbreak of any contagious disease has shown itself.

The following are the animals imported during the year:—

Horses.....	1,041
Cattle.....	43
Mules.....	1
Pigs.....	1

I have the honour to be, sir,

Your obedient servant,

W. S. BELL, V.S.,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 52.

REPORT ON LIVE STOCK CARS AND YARDS WEST OF WINNIPEG.

(CHAS. W. PETERSON, Inspector.)

CALGARY, N.W.T., October 31, 1903.

SIR,—I have the honour herewith to submit my report for the year ending October 31, 1903.

YARD INSPECTION.

I am pleased to be in a position to state that there has been a marked improvement in the condition of shipping and feeding yards all over my division, which includes all that portion of the Dominion lying west of Winnipeg. During the somewhat dry years which preceded the date of my appointment the condition of stock yards was a subject that was not brought very prominently before the public or transportation companies, but with the abnormal rainfall and the enormous increase in the volume of live stock shipments, the accommodation and state of cleanliness of these yards have become matters of very considerable importance, and it is only fair

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to state that the railway companies have displayed very considerable energy in improving these yards, and have invariably acted promptly on complaints made by me from time to time in the course of my inspection work.

The following statement shows the railway stock yard facilities available within my division:—

	No. of Yards.	Total car load capacity.	Average carload capacity.
Manitoba.....	73	286	3.95
North-west Territories.....	70	754	10.77
British Columbia.....	20	157	7.85
Total 1903.....	163	1,197	

During the year I have inspected all stock yards in the province of British Columbia and in the North-west Territories, including those along all branch lines of railway, and I have also inspected the more important yards in the province of Manitoba. All feeding and resting yards, as well as the more important shipping yards in my division, have been visited twice or oftener.

As stated in last year's report, the transportation companies have shown every anxiety to comply with the provisions of the law respecting the cleaning, &c., of stock yards, and cases that have come to my notice during the year of defective arrangements have generally been due to negligence on the part of employees charged with the duty of attending to these yards.

The usual number of complaints have been made respecting the condition of resting yards west of Winnipeg, which, as a rule, have not been well founded. Some shippers are only too ready to look for any excuse to avoid the expense of resting their stock en route, and frequently lodge claims with the railway authorities for losses occasioned by such action on the grounds that the yards were not in fit condition to accommodate the stock. When more humane methods prevail in connection with the treatment of stock in transit these complaints will not arise so frequently.

The Canadian Pacific Railway stock yards at Winnipeg have recently been removed and remodelled, and are now situated near the abattoirs at the west end of Logan avenue. Those set apart for cattle alone cover an area which is 1,035 feet in length by 255 feet in width, or a distance from east to west of one-fifth of a mile. This space is exclusive of a building specially erected for sheep and hogs, the dimensions of which are 37 by 250 feet. Some idea of the extent of this accommodation may be had when it is stated that the provision for cattle alone will enable a shipment of 150 cars to be placed within the comfortable pens at one time. By an admirable management of loading and unloading chutes, this part of the work can be carried on throughout the entire length of the system, the cars being loaded and unloaded without interruption.

The whole of this yard has been floored with three-inch tamarack and British Columbia fir, the cost of the flooring alone being in the neighbourhood of \$12,000. The questions of water supply and drainage have been carefully considered, and the yards will have the company's own supply extended as soon as the necessary work can be completed. The latter will be used exclusively, except during an emergency, when that of the city will be available.

An important departure has been inaugurated by the Canadian Pacific Railway this year, in turning over their feeding and resting yards to private corporations. The Winnipeg yards will soon be in charge of a stock yards' company, and it is understood that the yards at Calgary and Moosejaw will before long be under a similar

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form of management. There can be no doubt that this idea will have a distinct tendency towards improving the facilities for handling stock at these important yards, as companies depending entirely upon the good will of the public for their revenue and organized for the specific purpose of managing such yards, will naturally be able to devote more attention to details than a railway company could possibly do.

INSPECTION OF CARS.

Very few cases were brought to my notice where dirty cars were furnished shippers. The offending parties were properly reprimanded whenever complaints were lodged with the railway authorities. There can be no doubt that the action of the department in bringing all cases of complaints to the attention of the proper railway officials has had a splendid effect.

Some cases arose during the year where cars containing old litter were sent across the boundary line at Gateway, B.C., by the Great Northern Railway Company. It is unlikely that any repetitions of this offence will occur.

OFFICE WORK.

During the year the office was removed from Regina to Calgary. The latter point being more nearly in the centre of the division and located in the ranching portion of the Territories, I have been able to perform my duties more conveniently than hitherto.

A considerable number of circulars and letters have been sent during the year, and I have made it a point to keep in close touch with the brand inspectors throughout the Territories, whose valuable assistance and co-operation I have much pleasure in acknowledging.

I have the honour to be, sir,

Your obedient servant,

CHAS. W. PETERSON,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 53.

REPORT ON 'SWAMP FEVER' IN HORSES.

(F. TORRANCE, D.V.S.)

WINNIPEG, MAN., October 31, 1903.

SIR,—I have the honour to submit my report upon the season's work in the investigation of 'swamp fever' of horses in Manitoba. The disease has, fortunately, not been as prevalent this year as last, but while this is most satisfactory from the horse-owners' standpoint, it has been disastrous for our investigation. It has made it impossible to obtain the cases necessary for the work, and consequently but little progress has been made.

During the early part of the year, a few cases were obtained, but these were ones that had carried over the disease in a chronic form from the previous season, and did

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not furnish suitable material for observation. One of these was a mare which we had under experimental treatment during the previous summer with apparent success, and had turned over for the winter to a dairyman who agreed to feed her for her work. This she did satisfactorily for a time, and put on flesh, but later began to fail, developed a partial paralysis of the hind quarters, and finally died, illustrating the tendency of the disease to relapse. Some other cases were shipped to us shortly after this through the kindness of Dr. Hilton, of Portage la Prairie, but were so far advanced in the disease that one of them died before it could be removed from the stock yards, and the others lived only a few days. In every case, a careful post-mortem was made and cultures of various organs obtained for bacteriological research by Dr. Bell.

During the months of June, July, August and September, when the disease is usually prevalent, no cases could be obtained, and veterinary surgeons in various parts of the province reported that very little had been seen of the disease during the summer.

The ebb of the disease in Manitoba, which has had a dry summer, appears to coincide with a flow or increase in the North-west Territories, where the season has been unusually wet, a fact which lends support to the theory of swamp infection as the main source of the disease. With the return of wet seasons in Manitoba the disease is likely to resume something of its previous virulence, though the cultivation of the land, drainage of marshes and the use of cultivated grasses for hay should eventually reduce its ravages to a great extent. Farmers who have suffered losses from 'swamp fever' in other seasons have been advised through the agricultural papers to avoid pasturing their horses and to water them only from wells. This advice has had a good effect in diminishing the number of cases and reducing the loss.

The recently published report of the Minnesota State Board of Health contains an account of the work of Drs. Brimhall and Wesbrooke, in investigating a disease similar to 'swamp fever,' that exists in some limited areas of the State. These investigators have isolated from the blood and tissues of diseased horses, a bacillus which they have named *bacillus equisepticus*, and consider it the cause of the disease. The experiments to test this point by inoculating healthy horses with pure cultures of this bacillus do not seem conclusive, as the disease produced resembled septicæmia rather than 'swamp fever,' and there was no diminution in the number of the red blood corpuscles. Further research is necessary to determine the relation of this bacillus to the disease and also to ascertain whether the disease Drs. Brimhall and Wesbrooke have been investigating is identical with swamp fever of Manitoba or not. Work upon these points will be done as soon as suitable cases can be procured.

Recently some fresh cases have been observed, but as the owners have been unwilling to sell any of them at a reasonable figure, I have been unable to obtain any of our research. When the owners' consent can be obtained, however, the blood is examined for trypanosomata and bacteria, Dr. Bell assisting in the work. Three of these cases occurred in the outfit of a railway contractor who has just returned from work upon the Yorkton extension. He reports having lost eleven horses out of twenty-eight, and has these three still affected. The district in which he was working is low and wet, and the horses were watered in the sloughs.

No further information is available at present, and while regretting that, owing to causes beyond my control, the results are meagre and incomplete. I venture to hope that next year may give much better returns and clear up the pathogenesis of the disease.

I have the honour to be, sir,

Your obedient servant,

F. TORRANCE, B.A.,

D.V.S

The Honourable

The Minister of Agriculture,
Ottawa.

BOVINE AND HUMAN TUBERCULOSIS.

By D. E. SALMON, D.V.M., CHIEF OF THE BUREAU OF ANIMAL INDUSTRY, WASHINGTON, D.C.

Presented at the Meeting of the American Veterinary Medical Association, Ottawa, Canada, September, 1903.

The prevention of tuberculosis in the human subject has been for years and still is one of the most interesting and important questions confronting the sanitarian. There have been many differences of opinion; many cases in which the same facts have been interpreted in different ways; and much discussion and divergence of views as to what actually are the facts.

After the publication of the results of the investigations of Villemin, Chauveau and Gerlach in 1866, '68 and '69, which demonstrated the communicability of tuberculosis, veterinarians looked upon bovine tuberculosis as a communicable disease, and were inclined to consider it as identical with human tuberculosis. Their clinical experience, in stables where the disease clearly was introduced by a purchased animal and spread from beast to beast until the greater part of the herd was affected, confirmed the conclusions of these investigators, and it appeared to them further that there was often a remarkable coincidence between the use of milk from tuberculous cows and the development of the disease in mankind.

These views, however, did not gain much standing in the medical profession. The opinion of the great majority of physicians that tuberculosis was an hereditary disease was too deeply rooted to be dislodged except by the most overwhelming array of facts inconsistent with it. Koch's discovery of the tubercle bacillus in 1882, taken in connection with the experiments showing the transmissibility of the disease, brought a complete revolution of the medical mind with reference to its causation and prevention, and seemed to establish the essential identity of the tuberculosis of various species of animals with each other and with that of the human race.

New doubts arose, however, when in 1889 and 1890 Rivolta and Maffucci showed that there were very marked differences between human and avian tuberculosis. Theobald Smith's papers published in 1896 and 1898 demonstrating marked differences between a bacillus from the *nasua* and one of bovine origin, and between bacilli from human and bovine sources, recalled similar observations which had been made by Villemin, Pütz, and Sidney Martin, and aroused renewed interest in the study of varieties of this bacillus and the significance which might be attached to them. In 1897 and 1898 Dubard published papers on tuberculosis in cold-blooded animals, showing that the bacillus in this disease had varied in an extraordinary degree from the human type.

Notwithstanding the extreme divergence in biological characters between the avian, the piscine and the mammalian types of bacilli, investigators concluded that they were essentially the same, and that the avian might be changed into the mammalian and the mammalian into the piscine types by suitable modification of the environment. If, therefore, the avian bacillus could be made to produce tuberculosis in mammals, and the mammalian bacillus to produce this disease in fishes and frogs, there appeared no reason to doubt that the bovine bacillus could produce tuberculosis in man, since the human and bovine bacilli resemble each other much more closely than do the avian and mammalian or the mammalian and piscine forms.

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This, briefly, was the condition of our knowledge of the question when in 1901 Koch read his memorable paper before the British Congress on tuberculosis. In that paper he said: 'I feel justified in maintaining that human tuberculosis differs from bovine, and cannot be transmitted to cattle.' Concerning the transmission of bovine tuberculosis to man, he admitted that it was impossible to give this question a direct answer, because the experimental investigation of it with human beings was out of the question. He said, however: 'It is well known that the milk and butter consumed in great cities very often contain large quantities of the bacilli of bovine tuberculosis in a living condition,' and if these bacilli 'were able to infect human beings, many cases of tuberculosis caused by the consumption of alimenta containing tubercle bacilli could not but occur among the inhabitants of great cities, especially the children.' He concluded that 'in reality, however, it is not so.' The only facts which he cited in support of this remarkable conclusion were some selected post-mortem statistics which indicated that primary tuberculosis of the intestine was an extremely rare disease. He expressed an important assumption as follows: 'That a case of tuberculosis has been caused by alimenta can be assumed with certainty only when the intestine suffers first.' But he did not admit that all such cases are caused by bacilli ingested with the food. 'It is just as likely,' he said, 'that they were caused by the widely propagated bacilli of human tuberculosis, which may have got into the digestive canal in some way or other—for instance, by swallowing saliva of the mouth.' He said we may determine from which source the infection occurred by inoculating cattle with a pure culture of the bacilli found in the tubercular material, and for this purpose he recommended subcutaneous injection, which he said 'yields quite specially characteristic and convincing results.'

He reported that he had experimented upon nineteen head of cattle by infecting them in various ways with pure cultures of tubercle bacilli taken from cases of human tuberculosis or with sputum from consumptive patients. In some cases the tubercle bacilli or the sputum were injected under the skin, in others into the peritoneal cavity, in others into the jugular vein. Six animals were fed with tubercular sputum almost daily for seven or eight months; four repeatedly inhaled great quantities of the bacilli distributed in water and scattered in the form of spray. None of these cattle showed any symptoms of the disease, and no trace of tuberculosis was found in their internal organs. The animals were absolutely insusceptible to these bacilli. An almost equally striking distinction between human and bovine tuberculosis was brought to light by feeding swine with tubercular sputum and by injecting tubercle bacilli into the vascular systems of asses, sheep and goats. In all these experiments bovine material was used upon similar animals for comparison.

These experiments would be quite convicting as to the harmlessness of tubercle bacilli from man for these various animals, were it not for the fact that it has been shown there are great variations of virulence in tubercle bacilli from different human subjects. Vagedes, working under Koch's direction, had shown this three years before the paper was read at London, and yet Koch gives no hint of this, nor does he admit the least suspicion that there might be different results with different infective material.

Perhaps the most astonishing statement made by Koch in his London paper is found in the following sentence: 'If one studies the older literature of the subject, and collates the reports of the numerous experiments that were made in former times by Chauveau, Guenther and Harms, Bollinger and others, who fed calves, swine and goats with tubercular material, one finds that the animals that were fed with the milk and pieces of the lungs of tubercular cattle always fell ill of tuberculosis, whereas those that received human material with their food did not.'

Now, the fact is, Chauveau, in a remarkable series of experiments, did infect cattle with human tubercular material, and obtained just as serious results as with bovine material. His conclusion was that the human tubercular virus acts on the

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bovine species exactly like the tubercular virus which comes from the bovine species itself. Bollinger inoculated a young calf in the peritoneal cavity with material from a human lung. When killed at the end of seven months the mesentery and peritoneal covering of the spleen presented a number of tumours from the size of a pea to that of a walnut, which microscopically were identical with those found in pearly disease under natural conditions. The retroperitoneal and mesenteric glands were tuberculous also. The paper of Guenther and Harms upon this subject I have not been able to consult, nor have I seen any satisfactory summary of it. At least two out of three of the older experimenters cited by Koch had therefore obtained positive results by inoculating cattle with human tubercular material.

Koch was equally inexact in his citations concerning his own previous declaration on this subject. He said: 'Even in my first circumstantial publication on the etiology of tuberculosis I expressed myself regarding the identity of human tuberculosis and bovine tuberculosis with reserve.' What he really said in that paper was this: 'Bovine tuberculosis is identical with human tuberculosis, and therefore a disease transmissible to man. * * * However great or small may be the danger which results from the consumption of meat or milk affected with bovine tuberculosis, it is present and must therefore be avoided.'

In the period which has elapsed since the London Congress, a period of less than two years, a considerable number of investigators have had positive results in the inoculation of cattle with tubercular material from the human subject and with pure cultures of tubercle bacilli from the same source. Among these may be cited Ravenel and de Schweinitz in this country, and Thomassen, de Jong, Delepine, Orth, Stenstrom, Fibiger and Jensen, Max Wolff, Nocard, Arloing, Behring, Hamilton and Young, and Dean and Todd. Some of these and other investigators have also produced the disease in sheep, goats and swine by infection in various ways with human tuberculosis. As the animals named were refractory in Koch's experiments, the success of various experimenters with them is quite significant.

In the Bureau of Animal Industry two distinct lines of experiments have been carried on, in order that one might be checked up against the other. De Schweinitz, in the Biochemic division, has isolated nine cultures from human tuberculosis. Two of these were derived from human sputum, three from cases of generalized tuberculosis in adults, and four from cases of generalized tuberculosis in children. These cultures were compared with a newly isolated virulent culture of bovine tuberculosis, and among them two of the cultures from children were found to be identical in their cultural and morphological characters with the bovine bacillus. They also killed rabbits and guinea pigs in as short a time as did the bovine bacillus. Hogs inoculated subcutaneously with these two cultures from children died of generalized tuberculosis. Two calves, weighing over 300 pounds each, developed a generalized tuberculosis after a subcutaneous inoculation with these virulent human cultures, and a yearling heifer inoculated with one of them showed generalized tuberculosis when killed three months after inoculation. Both the cattle and the hogs had been tested with tuberculin and found to be free from tuberculosis before the inoculations were made. It will be observed that 50 per cent of the cultures obtained from children were virulent for cattle.

Mohler, working in the Pathological division, has obtained three very virulent tubercle bacilli from the human subject. A goat inoculated subcutaneously with a culture of one of these died in 37 days with miliary tuberculosis of the lungs involving the axillary and prescapular glands. This bacillus was obtained from the mesenteric gland of a boy. Of still greater interest is a bacillus isolated by Mohler from human sputum. A goat inoculated subcutaneously with a culture of this germ died in 95 days of pulmonary tuberculosis. A cat inoculated in the same manner died in 23 days of generalized tuberculosis. A rabbit similarly inoculated died in 59 days of pulmonary tuberculosis. A rabbit inoculated with a bovine germ for comparison lived 10 days longer than the one inoculated with this sputum germ.

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It is plain from these experiments that there is a great difference in the virulence of tubercle bacilli from human sources, and that while some of these are not capable of producing serious disease in cattle, sheep, goats and swine, there are others which produce generalized lesions and are very fatal with such animals.

Having disposed of the argument that human tuberculosis is not transmissible to animals, let us briefly consider the other proposition, viz., that bovine tuberculosis is not transmissible to man.

The proportion of cases in which the primary lesion is in the intestine is a very poor criterion from which to judge the proportion of cases caused by ingestion of the bacilli with the food. With experimental animals in which the disease has been produced by feeding tubercular material we very frequently fail to find any lesions in the intestines, and we find the oldest lesions in the mesenteric glands, the liver, spleen, kidneys, or perhaps in the lungs. Koch tells us that in his experimental swine fed with the tubercular sputum of consumptive patients no trace of tuberculosis was found, except here and there little nodules in the lymphatic glands of the neck, and in one case a few gray nodules in the lungs. With these results before his eyes how could he consistently claim that we must find primary lesions of the intestine in all cases of ingestion tuberculosis? With pigs particularly, but probably with all animals to a certain extent, the tubercle bacilli taken with the food may penetrate the walls of the pharynx, and advancing down the neck gain entrance to the lungs. The same method of infection has been repeatedly noted with children. Again, it has been shown by the experiments of Desoubry and Porcher and those of Nicholas and Descos that various kinds of bacteria, including tubercle bacilli, may penetrate the intestine, without causing any local lesion, and pass directly into the chyle vessels and from these into the blood whenever milk or fat constitutes a considerable proportion of the food.

These facts being admitted, it is absurd to hunt through the statistics for primary lesions of the intestine as an argument for or against infection with bovine tuberculosis. In the hospital statistics of Great Britain we find a considerable proportion of cases with children, 25 to 30 per cent, in which there are primary lesions of the intestine. In other countries such cases are quite rare. Heller has recently made 714 post-mortems of children who had died of diphtheria, and among these found 140 who had an associated affection of tuberculosis in various organs. Only 1.43 per cent showed primary intestinal tuberculosis, but in 37.8 per cent the primary lesion was in either the intestine, the mesenteric glands, or in other abdominal organs. It would appear, therefore, that even in Germany there is abundant evidence of ingestion tuberculosis.

This brings us to the question as to how we can tell whether a case of tuberculosis which is evidently caused by penetration of the bacilli through the walls of the pharynx or those of the intestine is due to bovine bacilli taken with the food or to human bacilli which have been swallowed with the saliva, &c. The test that Smith and Koch have laid down is that we should isolate the bacilli, and by the inoculation of cattle show that these bacilli have the virulence of the known bovine bacillus. This résumé of the condition of the experimental knowledge of the subject makes clear the importance of such experiments as have been made in the Bureau of Animal Industry to show the effect of bacilli from the human subject upon the principal domesticated animals. These experiments aid in filling a gap which it was necessary to bridge before we could fully and completely answer the arguments of those who believe it is unnecessary to consider the existence of bovine tuberculosis as a factor in the control of human tuberculosis.

You will observe that de Schweinitz has isolated tubercle bacilli from human lesions which when cultivated in the laboratory are of the bovine type, and that he has produced fatal disease in bovine animals by inoculating them subcutaneously with cultures of these bacilli. That is, he has fulfilled the most difficult requirements as

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to experimental work which those who oppose the theory of the transmission of bovine tuberculosis to man have been able to formulate. The results of these experiments make it necessary to admit either that human and bovine tuberculosis are identical, or that, being different, the bovine form is transmissible to man. There is no third theory by which the presence in human lesions of tubercle bacilli having the characteristics of the bovine type can be satisfactorily explained.

From the standpoint of experimental medicine, the evidence which has been brought forward should be sufficient to settle the question of the transmission of bovine tuberculosis to man. Koch plainly said in his London address that all that was necessary to decide with certainty whether the tuberculosis of the intestine was of human or of animal origin was to cultivate in pure culture the tubercle bacilli found in the tubercular material, and to inoculate cattle with them. In his latest address on this subject, which was made at the International Conference on Tuberculosis at Berlin, he practically abandoned the discussion from the experimental standpoint and devoted his time to a discussion of clinical evidence. As might be expected, he found none of the cases of supposed transmission of bovine tuberculosis to the human subject to be entirely free from the possibility of criticism. He seemed to forget that if demonstrations could be so easily made from clinical observations it would be unnecessary to devote so much time and expense to experimentation.

In the address mentioned he laid down a set of conditions which must be fulfilled to make clinical evidence convincing. Briefly, these are as follows:—

1. Certain proof of tubercle, and where possible the primary focus must be supplied. (To this condition the only objection is that the primary focus, which is made so much of, is of little value in determining the origin of the infection, for the reasons already given.)

2. Other sources of infection must be excluded with certainty. (This condition absolutely excludes all clinical evidence bearing upon the subject of tubercular infection. How is it possible to prove that any given individual has not been exposed to the bacilli of human tuberculosis? He tells us that the main source of the infection of tuberculosis is the sputum of consumptive patients. We are all inclined to admit this; but suppose we try to get such clinical evidence in favour of this proposition as he asks for in regard to bovine infection, where are the cases recorded? You say a certain person who has recently contracted consumption had habitually been in a room with another consumptive patient, and was infected by that patient. Very well; but how can you prove that that person never ate any tuberculous meat, never partook of any tuberculous milk, never ate any butter containing the tubercle bacillus, never had an opportunity to be indirectly infected from the hands of cooks or from table utensils which had been in contact with tuberculous meat, milk or butter, and was never exposed to the infection scattered in so many ways by tuberculous animals? Can you exclude with certainty all these sources of infection? Certainly not; the thing is impossible. Now what becomes of the evidence upon which Koch bases the assertion that the main source of the infection in man is the sputum of consumptive patients? Surely he should be willing to try the clinical evidence bearing upon this point by the same requirements which he demands for the clinical evidence by which we endeavour to establish infection from bovine sources.)

3. In each case of alleged infection from milk affected with 'Perlsucht' the condition of the rest of the people who have taken the same milk should be borne in mind. These fellow consumers form to a certain extent a control experiment, and if of the numerous people who have drunk the suspected milk only a single one sickens, this weighs decidedly against the belief that this one person was infected by the common food. (Suppose we apply this principle to our clinical case of alleged sputum infection, what is the result? Are there not scores of people exposed to many consumptives without contracting the disease? Are not the most of us exposed scores of times to consumptives without having contracted the disease? And yet, how er-

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roneous it would be to exclude clinical evidence suggesting contagion because only one of those exposed to a certain consumptive had contracted the malady.)

4. The source of the milk should be attended to. Since in recent years it has become more and more evident that milk containing tubercle bacilli is yielded only by such cows as suffer from tuberculosis of the udders, the general statement that some one has drunk milk from a cow suffering from Perlsucht no longer suffices to prove to us that Perlsucht bacilli have really reached his digestive organs. It must be milk from a cow with tuberculosis of the udder, and therefore a statement on this subject should not be wanting in a report on milk infection if it is said to be complete. (This argument is antiquated, since it has been proved again and again that the milk of tuberculous cows often contains tubercle bacilli when no lesions of the udder can be discovered. Of the many experiments that have been made to determine the proportion of tuberculous cows which yield infectious milk, the average results are about 15 per cent, while the cases with tuberculosis of the udder are not over 2 or 3 per cent. It is not necessary to comment further on these requirements.)

Koch advances another line of argument which I have heard elsewhere, and which appears to me most misleading. He says: 'We cannot but expect that if tuberculous infection through partaking of meat and milk infected with Perlsucht really occurs as frequently as is asserted, direct observation must make this obvious.' He then recalls the so-called cases of meat poisoning, and cases of illness resulting from the use of the flesh of animals which had suffered from splenic fever, also to the distribution of typhoid infection through milk. 'It is,' he alleges, 'extraordinarily characteristic of all these animals that they do not occur as isolated illnesses, but in groups, and often in epidemics. This could scarcely be otherwise, for the milk of a cow, the flesh of a sick animal, is practically always partaken of by several, and often by a great many people at the same time, who will be infected and fall ill, certainly not as a whole, but on a larger or smaller percentage. * * * A tuberculous infection must also take shape in the same way if tubercle bacilli which are virulent for man are found in meat or milk.'

The fallacy of this argument lies in the difference in the illnesses referred to, and in the conditions of exposure. The opportunities for contracting the illness known as meat poisoning, or that of splenic fever, are extremely rare, and it may reasonably be assumed when a group of such cases occur at the same time and near together that they are of common origin. Moreover, the period of incubation in these diseases is very short, and the symptoms are striking and serious from the beginning of the illness. Attention is immediately attracted to them. It is the very opposite with tuberculosis. There are opportunities everywhere of contracting it; there may be a dozen cases in the same town, and yet if the individuals are not in the same family no one thinks of a common origin. Then the period of incubation is so long and the access of the disease is so mild that it does not attract attention until so long time has elapsed that the incidents which occurred at the time of infection have faded from the mind and can no more be recalled. Finally, the time which passes between infection and the appearance of marked symptoms of the disease varies so much with different individuals that if infection occurred at the same time with a number of persons the disease would not appear so simultaneously as to attract special attention, as it does in meat poisoning or in splenic fever infection. The comparison with the distribution of typhoid fever infection through milk is a better one, but the difficulty of tracing this infection in a community where the disease is common and the sources of the contagion numerous may, I think, be appreciated by all. But typhoid infection must as a rule be much more easily traced than tubercular infection, because the sources of the contagion are not so numerous nor widely distributed, the incubation is shorter, and the symptoms are more serious at the beginning. On the other hand, so much of the milk and butter sent to market is infected with tubercle bacilli, and we consume these food products from so many

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different sources, that practically every one must take bovine bacilli into his digestive organs, not once only but many times. Now, when the disease develops, even if we prove by the characteristics of the bacilli that it has been caused by germs of bovine origin, how can any one point with certainty to this milk or this butter, consumed weeks or months before, and say that it was the cause of the infection?

Take, if you please, the average citizen who travels from place to place, passing his nights in sleeping cars under possibly infected blankets, or in hotel rooms of the history of which he knows nothing, who drinks at the fountains out of the common drinking cups, who must necessarily come into close contact with many consumptives, who inhales dried sputum on the streets. If he becomes infected, can you point with certainty to the source of his infection? Certainly not; nor can you point out groups of patients who have been infected by one and the same consumptive person, although many individuals were exposed to that person. If this cannot be done in the case of infection from human sources, how can we expect it to be done with infection through meat, milk, and butter?

We can only hope to get fairly satisfactory evidence as to the source of infection in the case of young children who have been in one house during their whole lives and who have not come into contact with any tuberculous persons. But in most cases, it would appear from the present condition of our knowledge that the virulence of the bacilli for cattle will be the best evidence of the source of the infection; that is, whether it comes from man or from the lower animals. The experimental proofs of tubercle bacilli in human lesions, having all the virulence of the bovine bacillus, are incontestable, and should cause sanitarians to take adequate precautions against infection through the products of diseased animals. The frequency of infection from animal sources can only be determined by long and careful investigation, but we do know how common the disease is with cows, how often the bacilli are found in the milk, and how frequently tuberculosis attacks children at the milk-drinking age.

Very recently (July, 1903) Kossel has given some of the results of the investigations of the German Tuberculosis Commission. This commission has studied and tested the virulence of 39 different fresh cultures of bacilli from human tuberculosis. Twenty-three of these cultures were from adults and 16 from children. Among the 16 cultures from children 4 were virulent for cattle. Two of these were cases of primary tuberculosis of the digestive organs, and two others were miliary tuberculosis. Kossel states that while these cultures were not as virulent as the most virulent cultures of the tuberculosis of animals, they were much more virulent than the weaker cultures of cattle tuberculosis. It is plain, therefore, that these cultures were of about the same virulence as the average bovine tuberculosis, and that this commission, working according to the principles laid down by Koch, has found 25 per cent of the cases of tuberculosis in children investigated by them to have been caused by infection with bovine tuberculosis. Whether this is a greater or smaller proportion than some have believed is of little consequence. The figures are definite, and to most of us it would be astounding if it should be found that they are of general application. The danger from bovine tuberculosis can no longer be doubted; and whether it is found that 25 per cent of the cases of tuberculosis in children, or a greater or smaller proportion, are due to infection from animal sources, it is plain that the proportion is sufficiently high to make the prevention of such infection a matter of the greatest importance.

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THE BANG SYSTEM FOR STAMPING OUT TUBERCULOSIS IN CATTLE.

BY THE HON. W. C. EDWARDS.

Coming to the subject on which I am to occupy your time for a few moments, referring to the close alliance and association between human beings and domestic animals, and recalling the statement made by the great German scientist, Dr. Koch, about two years ago, the question of tuberculosis in our domestic animals would appear not to have the same significance as affecting human beings as was formerly generally supposed. The relation or similarity as between human and bovine tuberculosis and the communicability from one to the other is, however, one for scientific and professional men to thresh out. I will not presume to express my opinion on this complex question. I will be permitted, however, I am sure, to say that for myself I regard the safest course, while doubt still remains, is to allow the doubt to rest on the side of the greater security, and continue to assume that there is danger until it is uncontrovertibly proven that there is no danger of human beings contracting tuberculosis in various ways from domestic animals so diseased. But even if finally it is proven that the disease is not communicable from animal to man, there is no reason why the efforts being made for the eradication of the disease in our animals should be stayed for a moment. In our best interests, having regard to the animals only, it is most highly desirable that the disease should be eradicated. It is to be found to the greatest extent in our pure-bred herds, the source from whence sires are obtained for the general improvement of the herds the world over, and unless our pure-bred herds are cleansed of the disease the process of spreading it will go on until it pervades the entire live stock interests of each country where it is not eradicated, and the extent to which it will be injurious to the live stock of each country will be measured by surrounding conditions, and the loss of animals will be measured largely by the general sanitary or unsanitary and other conditions prevailing, so that regardless of the matter of the danger to human life, it is highly in the best interests of the stockman that his herds and flocks should be free from disease of every nature, and the question arises—can tuberculosis, one of the most constant diseases present in animals, be eradicated? My answer is 'yes,' most emphatically. It can be done, and once eradicated, by reasonable care healthy herds and flocks in this respect can be maintained; and the system we recommend is the Bang system, which has been rigidly practised on our farm since the year 1898. In the spring of that year, intending to ship some young bulls to Wisconsin, we asked our Dominion veterinary authorities to test them, and to our surprise and regret it was found that all responded to the tuberculin test. This was our first knowledge of the existence of the disease in our herd. For a few days we were undecided what course to pursue, but on consultation with Hon. Sydney Fisher, Minister of Agriculture, who recommended testing the whole herd, and who further urged upon us the advisability of adopting the Bang system for the eradication of the disease, and on our consenting he at once placed us in communication with Dr. McEachran, then Chief Dominion Veterinary Inspector, who immediately had the entire herd tested, and gave us full information and instructions as to the Bang system. The greater part of the herd responded to the test, and a separation was at once made of the healthy from the diseased animals. The decision was to weed out and kill all but animals of desirable pedigree and individuality, and the slaughtering took place under veterinary inspection. Of the 50 to 60 animals slaughtered, only 3 proved unfit for human food, but in all traces of the disease in a more or less degree were found,

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but in most cases very trifling traces of it. The stables formerly occupied by the herd were most thoroughly disinfected for the reception of the healthy animals, and entirely new premises were erected for the diseased animals we retained in our herd, and in like manner the diseased animals have been kept in separate and distinct pastures from the healthy ones since that time, and have never mingled in any way.

Raising the Calves.

In the inception of our experiments we sterilized the milk from the diseased cows as directed by Dr. McEachran, and fed the calves from the pail. This plan we found successful in so far as raising sound calves was concerned, but it is a somewhat troublesome one, and further, we lost a few calves as we believe from the fact that they were so fed at once without first taking the mothers' milk in the natural way. This plan, while successful, we have discarded entirely, and we have adopted the plan of raising the calves on nurse cows, allowing the calf always to suck the mother once before making the change. This plan we have found most successful in every particular, and in the practice of either of these plans described we can vouch for it from our experience that healthy calves can be most successfully raised from diseased dams or diseased sires and dams, and if all is carefully carried out the percentage of diseased calves raised will be very small indeed; so small that it need hardly be considered. In our experiments everything has been entirely satisfactory to us, and we strongly recommend the practice to our brother breeders, many of whom we are sorry to say have, up to this time, resisted the advice in this respect of our veterinary authorities both in the United States and Canada, and the subject has been a most controversial one. We can only say for our part that after a very considerable experience we are firm believers in the Bang system, and we are believers in the tuberculin test as the only present means, so far as we are aware, of ascertaining the existence of the disease. The only failure, so far as we have knowledge of, is in cases where the disease is in such an advanced stage that reaction does not take place. In a well conducted herd such cases will be few and far between. Further, we have experienced none of the unfavourable results that are put up by those opposing the test. In no case have we known in the many hundreds of animals we have had tested of an injury to the animal, neither have we experienced any trouble in abortion in cows tested, and we have had them tested at all stages of pregnancy.

We are firm believers in the tuberculin test, as we have described, and we are also firm believers in the Bang system, and until these are improved upon—if they can be improved upon—we shall practice both in the management of our herd. No matter what the practice and requirements of our government authorities may be, we on our part shall not relax our efforts in the direction I have stated, until all our herds are absolutely free from the disease, and until better means are known we shall always use the tuberculin test to ascertain the conditions of the health of our herds.

Education and United Effort Needed.

Having given our practice on the farm, I may now be permitted, perhaps, to make a few general remarks. The discovery of the extent of the disease in the herds of various countries a few years ago caused such a commotion that most rigid enactments were passed by several legislative bodies; extreme conditions were imposed, doing unfortunately, in our opinion, a great deal of harm, arousing the antagonism of breeders and stockmen. Much of this legislation has been rescinded, and more reasonable measures are now adopted as a result of a greater knowledge of the subject. Mistakes, if there have been mistakes, were not wilful, but well intended on the part of the authorities of each country, but we submit that if the disease is to be eradicated from any country it must be through a campaign of education and united effort on

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the part of the breeders of the country. The exclusion of importations will never help to eradicate the disease just so long as the disease exists in the herds of the importing countries, and our veterinary authorities will do well to show the simplicity with which the disease may be eradicated, rather than impose unnecessary conditions.

Apart from the test and the application of the Bang system, cleanly and sanitary conditions, good ventilation and plenty of sunlight, and as much outdoor life as possible are the requisites. To the beginner in stock breeding we would advise great care in seeing to it that he begins his operations with animals free from disease, and that he attends well to his ventilation and sanitary conditions, and if at any time he buys to strengthen his herd, to see to it to a certainty that he does not buy disease with the animal.

To the breeder, small or large, who discovers the disease to exist generally in his herd, if the animals are of inferior pedigree and individuality, we recommend turning off to a butcher, to be killed under veterinary inspection, all animals that respond to the test, and begin anew; but in no case would we recommend the slaughtering of valuable animals where they are still in good breeding form and vigorous appearance, but we advise the system of separation we have described in this paper. The same full measure of separation may not always be possible, but the best that can be done should be done in each instance, and under no circumstances neglect the matters of ventilation, good sanitary conditions, plenty of sunlight, and as much open air life as possible. I am fully convinced of the reasonable possibility of the eradication of tuberculosis from our herds, and of the maintenance of sound herds, and my earnest hope is that our breeders may at no distant day be so educated in the direction I have endeavoured to describe that they will put into practice the only present known means of ridding their herds of a disease which in the past has been so destructive in its consequences.

ANTHRAX AND BLACK-LEG.

BY DR. CHARLES H. HIGGINS, B.S., D.V.S., PATHOLOGIST, DEPARTMENT OF AGRICULTURE.

The title of my paper was not selected on account of its scientific value, nor on account of any original work accomplished by the writer in connection with either affection; but, rather, with a view to giving a comprehensive idea of the differences between these two affections to the general practitioner, which will enable him to more easily make a correct diagnosis, thereby causing a financial gain, not only to himself but to his client as well.

Some criticism may be offered at the common-place term used ('black-leg'), but I consider this advisable, owing to the idea which has gained ground in some sections, and I am sorry to say by some professional men, that the two diseases are similar in their nature and the methods of inoculation for their prevention.

The history of either disease can be traced back through the preceding centuries with little difficulty, even though the exact nature of their causative agent was an unknown quantity.

At the present time, through the perfection of our microscopes, we are able to detect the infective agent, not only of these two diseases, but the infective agent of the majority of the contagious diseases of man and animals. It is then apparent that we are indebted to the perfection of our microscopes, not only for the detection of the infective agents of the contagious diseases, but also for our present knowledge of their prophylaxis and preventive treatment.

To deal progressively with these two affections, I will cite circumstances which the country practitioner is liable to encounter in the regular routine of his practice at any time.

His services are required immediately; some cattle are dead, others are in a dying condition; the owner or owners are excited, and from the quick onset of the disease and the almost total absence of symptoms immediately suspect poisoning by a near neighbour with whom they are at loggerheads.

A careful and quick diagnosis is imperative, not only for the protection of the other animals on the farm, but, if the case be anthrax, for the protection of the human beings who may come in contact with the animals or their products after death.

In anthrax, the diagnosis may be established by the short duration of the illness; the animal may be of any age or variety; as a rule, appearing in perfect health the night before, and being found dead or nearly so in the morning. There is usually a bloody discharge from the nostrils and anus. This in itself should arouse suspicion, and make one particularly careful in handling the carcass, that he may avoid infecting himself or others, or distribute the infection over the ground when removing the carcass to a suitable place for burial. If there is still doubt, a few drops of blood may be obtained on a clean piece of notepaper, allowed to dry in the air before being folded, and forwarded by mail to a laboratory for microscopic examination, which examination will yield positive results.

If it is necessary to confirm the diagnosis immediately, an autopsy may be performed, but it must be borne in mind that this is a very dangerous procedure, and one which can usually be dispensed with even in the most remote sections.

At an autopsy on a case of anthrax, hemorrhages will be noted throughout all the tissues and organs of the body. The spleen will be greatly enlarged and very dark

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in colour. The blood flows freely, is of a dark colour, tarry, and does not coagulate.

The carcass of such an animal should be destroyed by fire as soon as the diagnosis is made or suspected, care being taken that all discharges and litter about the animal be burned with it, even to the halter. The animal should, under no consideration, be skinned, as this is a most dangerous procedure; nor should it be dragged over the whole farm with a chain around its neck or leg that a spot may be found where the digging is easy, for by this means the infection is very effectually spread, contaminating any inclosure through which the animal may be drawn.

Black-leg is a disease of the ox, and is seen more often in animals from six months to four years old. Its onset may be slightly longer than that of anthrax, the first symptom being usually lameness. Later an emphysematous condition of the skin covering the muscles is noticed, which gives an increased size to the quarter affected, and a crackling sound similar to the rustling of paper when the hand is passed over the area.

As a rule, there is no discharge from any of the natural openings of the body of a bloody character. The blood is coagulated and of normal colour. The spleen is normal. Congestion of the intestinal mucous membrane is at times present, and there may be some hemorrhages.

The skin covering the lesions is dry. The muscles are dark in colour, and decomposition takes place very rapidly.

The precautions taken in the handling of the carcass should be similar to those used in case of anthrax, although the danger to human beings is nil, but the danger of spreading the infection is as great.

With this disease, as with anthrax, there should be no difficulty in making a positive diagnosis in the field, but if it is desired to confirm the diagnosis, a few drops of bloody serum from the affected muscles, prepared in the same manner as blood from a case of anthrax, will yield positive results on microscopic examination.

Bacteriologically, the difference between the germs of anthrax and black-leg is as great as the difference in their lesions.

The anthrax germ is aerobic (i.e., grows only in the presence of oxygen), non-motile organism, a characteristic being the chain formation in artificial media or in the tissues.

The germ causing black-leg is anaerobic (i.e., grows only in the absence of oxygen), and is actively motile. Chain formation is not a characteristic.

Both germs form spores, which spores are capable of retaining their infective properties for an indefinite length of time. Either germ is easily propagated, provided suitable media and conditions are observed. Anthrax is easily stained, retaining the dye when treated by the Gram method. Black-leg bacilli are also easily stained, but do not as a rule retain the dye when treated by the method of Gram.

An opportunity for the treatment of animals affected with either disease is seldom obtained, and when such an opportunity is presented, it is usually fruitless.

The preventive inoculation against both affections is widely practiced, particularly in localities where it is known the infectious agent exists. The attenuated virus for the preventive inoculation is prepared in laboratories especially equipped for the work, of which there are many on this continent, some connected with the federal or state governments, others connected with firms who make a specialty of 'biological products.'

These vaccines when prepared with care and properly tested may be considered reliable. Anthrax vaccine as prepared requires two inoculations, the first preventing against infection by the second, and the second preventing against infection by a virulent germ. The interval between the two inoculations varies, but is usually from ten to twelve days. Black-leg vaccine is sold in two forms, the single and the double vaccine. The single vaccine is usually recommended for grade stock, while the double is for pure-bred animals; it being considered that a single vaccine which will act

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as a preventive against an active infective agent is too strong for pure-bred animals, which are considered more susceptible, owing to their high breeding. The method of applying black-leg vaccine is various, and is usually characteristic of the manufacturer, each firm desiring to obtain a method which is very efficacious and simple, that it may be placed in the hands of the layman as well as the veterinarian. The results of vaccination against either infective agent are considered successful.

FOOT AND MOUTH DISEASE.

Canadian stock owners and veterinarians have been fortunate in that hitherto they have had little need for knowledge of Foot and Mouth Disease. Its recent appearance in New England however, has suggested the advisability of issuing a brief bulletin giving a general description of the disease in question, its symptoms and treatment and the various channels through which it spreads.

This malady has many other names as Eczema Epizootica, Epizootic Aphtha, Aphthous Fever, &c., but it is now commonly known in English speaking countries as Foot and Mouth Disease, owing to the fact that its specific effects are, as a rule, more readily observable in connection with the feet and mouth than elsewhere, although the skin and mucous membranes generally are also affected.

There is conclusive evidence of the existence of this disease in Europe before the middle of the eighteenth century.

It first appeared in Britain, so far as is certainly known, in 1839, and from that date until a very few years ago, it was one of the most persistent scourges of the herds and flocks of the mother country. For eight or nine years back, however, it has been kept under control, and although it has been introduced several times, it has never been permitted to extend its ravages.

It was first observed in Canada in August, 1870, having been introduced by cattle landed at Montreal. A number of herds in Quebec, Ontario and the North-eastern States became involved, but the infection did not survive the winter.

In 1875 it appeared near Toronto in some imported sheep, and although it spread to some extent, it was stamped out through the well directed efforts of Professor Smith who, however, attributes his success largely to the advent of cold weather.

In 1884 a slight outbreak occurred in cattle landed at the quarantine station at Point Lévis, but the prompt measures adopted by my predecessor prevented its obtaining a foothold in the country.

The exact nature of the germ to which Foot and Mouth Disease owes its existence is not yet definitely decided. It is not of a fatal nature, the rate of mortality, in ordinary outbreaks, seldom exceeding one or two per cent of the adult animals affected. It causes, however, great financial loss to stock owners through shrinkage of flesh, milk and general condition, while abortion in pregnant animals is very common, and in severe cases troublesome complications are liable to persist long after the disease itself has run its course in the herd.

Originally it appears to be a disease of cattle, but it is easily transmissible to sheep, swine and poultry as also in a less degree to horses, dogs, cats and other animals, while man himself is by no means immune. It is, without doubt, one of the most infectious diseases known, and the many different ways in which its germs are conveyed from place to place, render it very difficult to prevent its spread once it has made its appearance in a community.

As all the natural discharges of an affected animal are highly infective, and as some of them, particularly the saliva, are largely increased during the attack, the disease is readily conveyed to other animals by these media.

Fodder of every kind, including grass, readily becomes infected and when eaten by healthy animals will, in the majority of cases, produce the disease, while water is a frequent agent in its transmission. Halters, blankets, brushes, brooms, and pails are all sources of danger as is also the manure from infected animals. The disease has frequently been conveyed from farm to farm through the clothing of attendants and others and by the feet not only of affected animals, which, especially in the secondary stages

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of the attack, are exceedingly active agents in the dissemination of the infection, but of men, dogs, birds and other creatures.

The period of latency may extend from twenty-four hours to as many days, but once introduced in a herd, the disease will generally develop within a week.

SYMPTOMS.

The first symptoms shown by an affected animal are shivering, staring coat, arching of the back, stiffness, especially when the feet are involved, and loss of appetite. The sufferer will leave the herd and there is a tendency to seek shelter and warmth. There is always a decided rise of temperature which may reach 105° or 106° , although this may be unaccompanied by a corresponding increase in the pulse rate. Constipation is generally present and the action of the kidneys is likely to be irregular. Mucous discharges from the eyes and nose are often present and, especially in cold weather, there may be more or less coughing.

The premonitory symptoms as given above are shortly followed by the more definite local phenomena which characterize the disease. Among these, one of the first to be noticed in cattle is a peculiar smacking of the lips, accompanied by a profuse discharge of frothy saliva. This symptom is soon followed by the eruption in the mouth of the characteristic vesicles of the disease. These are generally first observed on the dental pad, one or more at each angle, seldom in the middle, although they may subsequently coalesce. They are soft, fluctuating and unaccompanied by any inflammation of the surrounding tissues, which are in fact generally somewhat paler than the rest of the mucous membranes. These are followed by similar though somewhat larger vesicles or blisters on the upper surface of the tongue. On this organ, although large in size, they are seldom numerous. Owing to the density of the mucous membrane they do not break readily, and may under run and unite, forming eventually large and very painful sores. Vesicles are frequently seen on the membrane lining the cheeks and palate, as also on that of the lower lip and occasionally on the muzzle. If these vesicles are not accidentally ruptured by the attempts of the patient to eat hard or coarse food, they burst spontaneously on reaching maturity. They contain in the early stages a yellowish lymph-like fluid which, however, becomes gradually more opaque. They leave raw, red and painful erosions which sometimes, persist for a considerable time, especially if irritated, as unhealthy ulcers, but which under favourable conditions, heal naturally although always somewhat slowly.

The saliva which in the early stages is thin and frothy, gradually becomes thicker and hangs in ropes from the mouth, infecting, especially after the vesicles rupture, everything with which it comes in contact.

A second crop of vesicles is occasionally thrown out. These are less in area but deeper and accompanied by more inflammation of the surrounding tissues.

In cows the udder often becomes affected, the lesions on that organ particularly in deep milkers or newly calved cows, being very serious and extensive. More or less inflammation is always evident, followed in a few hours by the development, usually on the teats, of the characteristic vesicular eruption. If left undisturbed, the vesicles generally burst within twenty-four or thirty hours of their appearance, although they sometimes dry up and scale off, their contents becoming absorbed. As a rule, however, they leave raw, purulent sores, which, if irritated by the hands of the milker or otherwise, are very apt to run together, sometimes extending over and blocking up the opening of the teat, causing congestion and possibly inflammation of the quarter affected. Secondary vesicles not unfrequently appear on the udder. The function of this organ, which is always more or less impaired in animals giving milk, is of course seriously interfered with and may be altogether suspended upon the development of the local lesions above described. The milk in almost all cases is unfit for use. It not only becomes thick, yellow and offensive, but it is exceedingly fatal to young animals, caus-

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ing death very suddenly, either from acute inflammation of the stomach and bowels, or by direct toxic action. In the human species it is highly dangerous to infants, and even in adults, it will in some cases transmit the disease, while in others it will produce serious gastric and intestinal disturbance. It may be rendered harmless by boiling or by the addition of salicylic acid, but even when so treated cannot be recommended as an article of diet.

In some outbreaks the external generative organs, both male and female, show the characteristic lesions of the disease, giving rise to much irritation and occasionally to severe inflammatory changes.

Some authorities state the disease at times affects the base of the horns, causing loosening and sometimes loss of these appendages, but this is of rare occurrence.

There is, however, no doubt that the skin, as a whole, is more or less affected in every instance, although, save in exceptionally severe cases, the lesions are apparent only on the thinner and more delicate portions.

Foot lesions in cattle are first indicated by lameness generally, though not invariably, sudden in its onset. This may affect one foot or it may involve them all. In the latter case motion is of course exceedingly painful and difficult, especially on hard or stony ground or among stubble. The animal will frequently, in the early stages be seen to shake the affected foot or feet, as if a stone or other foreign body were lodged between the digits.

As the pain in the feet, especially if all are involved, becomes more severe, the suffering animal will lie almost constantly, and while in this position will drag itself about in order to feed rather than attempt to rise and walk. In mild cases, relief is evidently obtained by standing in water or in cool wet marshy spots. On examination, pain, heat and swelling will be detected round the coronet, while, in white or light coloured cattle, redness of the part is also present.

Within twenty-four hours, as a rule, from the first appearance of lameness, the vesicles or blisters characteristic of the disease may be observed. These in cattle are generally confined to the hairless tissue about the junction of the digits, although they may, and frequently do, occur high up in the heel near the small horny excrescences in that region.

A few hours after their appearance these vesicles burst, discharging a clear yellowish fluid, and leaving bright red, angry sores showing ragged, whitish edges. These sores ordinarily heal rapidly, seldom leaving any scar or other bad result. Occasionally, however, more especially when affected animals have been driven some distance, a severe inflammatory action takes place, giving rise to serious local complications, such as shedding of the hoof, inflammation of the coronet or of the delicate internal structures of the foot, open joint, or even gangrene (mortification) of a portion or the whole of the extremity.

In sheep the disease is generally confined to the feet, only a small percentage of these animals presenting mouth lesions, which, when they do appear, resemble closely those already described in the case of cattle. The feet of sheep, however, are usually affected in a manner somewhat different from those of the larger animals. The vesicles are more frequently situated at the heels or directly on the coronet, than at the openings of the inter-digital space, their favourite seat in the bovine species. Owing to this circumstance, a gradual casting and renewal of the hoof is a not uncommon sequel of the disease in sheep. When this occurs, the new hoof, slowly growing downward from the coronet, displaces the old one, which, however, is not cast off until its successor is almost fully developed.

In the pig the mouth symptoms are slightly different from those shown by cattle and sheep, inasmuch as the vesicles are generally more in evidence on the snout and lips than on the tongue and inside the cheeks. The mammary glands are frequently involved. Except for a more acute and exceedingly painful laminitis, accompanied by a tendency to the abrupt shedding of the hoof, the foot lesions of the pig are almost identical with those of the sheep.

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TREATMENT.

The constitutional treatment in ordinary cases is very simple. It is generally advisable to move the bowels slightly, for which purpose a moderate dose of Epsom salts will be found most suitable. Should the temperature remain elevated, a few doses of nitrate of potash or hyposulphite of soda may be easily administered in the drinking water. Complications must be specially dealt with as they appear. In lingering cases or where great weakness supervenes, benefit will result from the judicious use of ale or stout combined with vegetable tonics. The food supplied should in all cases be soft and easily masticated, as gruel, mash, green grass, steamed hay, ensilage, &c. If roots are given they should be pulped. Careful attention to this phase of the treatment is demanded.

Local treatment is also simple. The vesicles should under no circumstances be intentionally ruptured, but must be allowed to burst of themselves, after which they may be dressed several times a day with a solution of alum, borax, iron sulphate or salicylate of soda, to which may be added a few drops of creolin or carbolic acid. Where unhealthy sores or ulcers occur, extending into the deeper tissues, the careful application of a mild caustic may be necessary. The feet should be kept as clean as possible. The sores resulting from the rupture of the vesicles may be dressed with the agents mentioned above as suitable for the mouth, although in some cases they may be used in stronger solution. For this purpose foot baths are useful, more especially as many affected animals like to stand in water or moist places.

A convenient mode of dressing the feet when animals are affected in large numbers is to drive them, once or twice a day, through shallow troughs containing the solution which it is desired to apply.

The udder when involved should be carefully handled; to prevent irritation from the hands of the milker it is advisable to use a teat siphon.

The foregoing is a brief summary of the methods hitherto in vogue, but within the last eighteen months an important discovery has been made by Professor Baccelli, a noted Italian pathologist, which, it is claimed, will revolutionize the treatment of foot and mouth disease.

Professor Baccelli's method consists in the injection of a solution of corrosive sublimate into the veins of affected animals.

The dose for an adult of the bovine species is about one grain. It is administered in combination with common salt solution. Its effects are said to be marvellous.

If administered before the development of clinical symptoms the progress of the disease is at once arrested, the only noticeable feature being a slight elevation of temperature.

In the more advanced stages of the attack the results are said to be even more striking, the temperature being almost immediately lowered, while the ulcers assume a healthy aspect, the appetite returns, lameness disappears and no secondary lesions occur. Even in the worst and most severely complicated cases, it is claimed that this simple remedy will check the disease and save the lives of the animals.

There has fortunately been no opportunity for this department to test the truth of these statements, but as they are made on excellent authority, it will be well to bear them in mind should the disease ever make its appearance in the Dominion.

PREVENTIVE MEASURES.

Once the disease is recognized, every possible effort should be made to prevent its spread. This, owing to the ease with which the infection is disseminated, is a matter of very great difficulty.

All movements of animals should be immediately stopped, and those affected isolated at once. If the outbreak is small and localized, slaughter may be advisable,

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especially as the flesh of animals affected with the disease in its ordinary form may be used with impunity.

In any case the most stringent precautions should be adopted to prevent the conveyance of the contagion to other premises or to animals not yet affected. Bedding, manure and rejected fodder should be burned, or failing this, thoroughly mixed with fresh lime, carefully guarded and buried or ploughed in as soon as possible. Carcasses of animals dead of the disease should be burned, and their hides or wool, if removed, carefully disinfected; this latter precaution of course applying also to the hides or wool of animals slaughtered. All clothing, halters and stable utensils are active infective media, and should either be burned or carefully disinfected.

Buildings, fences and other fixtures should be treated with hot steam or boiling water before being coated with lime wash containing a liberal allowance of chloride of lime, creolin or crude carbolic acid. Infected or suspected stock cars and yards, as also ships or boats which have conveyed diseased animals, should be dealt with in a similar manner.

The disease is frequently conveyed from place to place by human agency. Attendants, owners, interested neighbours, veterinary surgeons and inspectors should all exercise the greatest care in the disinfection of clothing, hands, boots, instruments, &c., after being among or in proximity to affected animals.

Dogs are very liable to convey the disease to or from neighbouring farms and should be closely confined when it is known to exist in any district.

Foot and Mouth Disease generally runs its course in from two to three weeks, but the contagion may retain its activity under favourable circumstances for a long time. Stables have been known to remain infective for twelve months, while in one case, troughs lying in an open field infected cattle after four months. One attack confers immunity for about five months, but animals readily become re-infected in subsequent outbreaks. Inoculation with a mixture of the blood of animals recently recovered and the lymph from active vesicles is said to convey similar immunity without producing the disease in an acute form. Ordinary inoculation is frequently resorted to in order that the duration of an outbreak may be curtailed by having all the animals in a herd affected at the same time.

Should the disease unfortunately appear in Canada no time should be lost in communicating the fact to the Department of Agriculture at Ottawa. Under the provisions of the Animal Contagious Diseases Act, persons concealing its existence are liable to a penalty of two hundred dollars.

J. G. RUTHERFORD, V.S.,

Chief Veterinary Inspector

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COMMISSIONER'S REPORT—FIFTH NATIONAL EXHIBITION—OSAKA, JAPAN, 1903.

REPORT OF THE FIFTH NATIONAL INDUSTRIAL EXHIBITION HELD AT OSAKA, FROM MARCH 1 TO JULY 31, 1903.

This exhibition was the fifth of a series of national exhibitions that have been held at different cities in Japan, under the direction of the Imperial Government. The city of Osaka, having risen to considerable importance as a commercial centre, was chosen as the location for the fifth national exhibition to be held from March 1 to July 31, 1903. Previous to this, the exhibitions had been of a purely domestic character, but at the Osaka exhibition, a new and special feature was the introduction of a section set apart for the display of exhibits from foreign countries.

The official invitation to Canada was conveyed by Honourable T. Nosse, Consul General for Japan in Canada. As the occasion was to afford an excellent opportunity for the exploitation of our products and manufactures in Japan, the invitation was accepted, and instructions were given to this branch to prepare a suitable exhibit.

Application was made for a space of 10 thousand square feet for the accommodation of Canadian exhibits, but it was learned that such an area would not be available in what was known as 'the foreign samples building.' The Japanese government, realizing the importance and size of our proposed exhibit, offered to erect a special building with a floor area of 7,200 square feet for the exclusive use of our government, for a rental charge of \$2,525, an amount equal to half the cost of its construction. Plans were submitted with the proposal, and being found suitable, the offer was accepted. The work of construction was at once commenced and the building was ready according to agreement, on January 15, 1903. Our thanks are due to the officials of the exhibition for the prominent position given to our building. It was situated in one of the best possible locations in the general group of buildings, and in close proximity to the Art Gallery, which formed the centre piece of the whole exhibition.

The Dominion of Canada was the only government which occupied a special building, in fact, it excelled all other foreign countries in the number, variety, and artistic arrangement of exhibits. The only countries represented by government exhibits and commissioners, were Korea, Netherlands, India, State of Oregon, U.S., and Canada. The rest of the foreign exhibits consisted of displays made by private firms, through their agents in Japan.

The rules of the exhibition precluded foreign exhibits from competition for awards. This being the case, it was decided that this government should arrange for a collection of such products and manufactures of Canada, as were marketable in Japan, and exhibit them as types, or samples, of what our producers and manufacturers at large were capable of supplying.

The exhibits consisted of the following:—

Grains and grasses of Canada, minerals of Canada, statistics of Canada, scenic views of Canada, fruits—viz.: 50 varieties of apples, fruits preserved in antiseptic fluid, showing all the varieties of fruit grown in Canada, Canadian hard wheat flour, demonstration of process of making bread from Canadian hard wheat flour, bread and buns,

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baking machinery—oven and mixer, cereal foods, canned goods—fruits, vegetables, soups, meats, fish, condensed milk and cream, biscuits, furniture for houses, offices and schools, metal ceiling and roofing, hardware: nuts, bolts, nails, screws, wire and chain, cordage, bicycles, rubber goods, salt, whiskey, butter, cheese, hams, bacon, maple sugar, maple syrup, honey, timber, lumber, sash and doors, pulp wood, wood pulp, printing and other paper, indurated ware, cooking ranges, kitchen utensils, oil stoves, cold storage plant, pianos, model of C.P.R. sleeping car, model of C.P.R. steamship Co. steamship '*Empress of Japan*.'

All of the above were installed in the Canadian building in time for the opening day, March 1.

The number and variety of our exhibits, and the novel method of their installation created an intense interest among the visitors to the exhibition. The native newspapers referred to the Canadian exhibits as 'the sensation of the exhibition.' Canada was hitherto comparatively unknown in Japan, and here for the first time, the abundance and variety of her natural and industrial resources were displayed in the Far East. By the exhibition officials, the Canadian exhibit was regarded as the leading feature and attraction of the exhibition, and was widely advertised as such. The building was crowded every day from morning till night. The total attendance at the exhibition was over 4,000,000, and included many nationalities besides Japanese; thus the influence of our exhibit may be expected to extend, not to Japan alone, but to China, Russia, India and other countries.

While stated above that no awards were given to foreign exhibitors, the Japanese government considered our exhibit worthy of some special recognition on account of its specially attractive arrangement and the great object lesson it afforded to their people. We were honoured by receiving a beautiful silver medal as a token of their appreciation of our display, and in addition, a special letter of thanks was given to each of the contributors to our exhibit.

THE OFFICIAL VISIT OF THE HONOURABLE MINISTER OF AGRICULTURE TO THE EXPOSITION.

The Japanese attached much significance to the presence at the exposition of Honourable Sydney Fisher, who went to Japan as Commissioner Extraordinary from Canada. This graceful act of international courtesy was duly appreciated by the imperial government and the people of Japan generally, and did much to promote the social and commercial relations between Canada and Japan.

As a special mark of favour, and as an evidence of the friendly relations existing between the two countries, their Imperial Majesties the Emperor and Empress of Japan, paid a special visit to the Canadian building. They were received by the Honourable Sydney Fisher, and conducted through the building and among the several exhibits, each of which was explained by the aid of an interpreter. Other visitors of note during the exposition were the Crown Prince and Princess and other members of the royal family, His Excellency Marquis Ito, the Prime Minister, members of the cabinet, and the Crown Prince of Siam, and many others.

A cold storage chamber occupied the centre of the Canadian building. This formed the centre piece of our exhibit, and was most artistically decorated with various Canadian grains and grasses, while on the top was a hugh crown covered with the same material. Three sides of the structure were utilized as show cases. These cases were used for the display of perishable products, such as apples, butter, cheese and meats. Several hundred plates of apples representing over fifty Canadian varieties were displayed on shelves. Butter, cheese, hams and bacon were also shown. Our fruits were highly commended for their beauty, flavour and keeping qualities. The cold storage case and its contents were an object of special interest to the people of Japan. Never before had they seen such a variety of fruits, nor the modern method of preserving them by means of cold storage.

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CANADIAN HARD WHEAT FLOUR.

The most effective part of the Canadian exhibit was the daily demonstration in bread making by the use of Manitoba hard wheat flour. In the past large quantities of winter wheat flour have been imported into Japan each year from Washington and Oregon, while Canadian hard wheat flour has been comparatively unknown. In order to demonstrate the superior value of Canadian hard wheat flour, a model bakery was installed, and the entire process of bread making was carried on in full view of the public. Under the direction of an expert baker from Canada, Japanese bakers were instructed in the use of hard wheat flour, and they became readily convinced of the economy of its use. The tests made proved to their entire satisfaction that while the cost of Canadian hard wheat flour was a trifle higher than winter wheat flour, the increase in the number of loaves produced by the former per barrel was more than the difference in the cost. In addition to the increase in the production, it was also clearly demonstrated that hard wheat flour produced a larger loaf of fine cellular construction and a rich nutty flavour, and was capable of retaining its freshness and flavour up to five or six days after leaving the oven. This was a striking contrast to the results obtained by using winter wheat flour. Here the result was a small-sized dry, hard loaf of little or no flavour, which dried up and became almost brittle when two days old.

The use of bread is becoming more common every year among the Japanese, and this demonstration of the superiority and relative economy of Canadian hard wheat flour has laid the foundation of what will, in a few years, become an enormous trade, not only in Japan, but throughout the far east generally. With our vast resources of wheat in western Canada, our milling and transportation facilities, we have every means and many advantages which enable us to supply flour to Japan and the far east. Flour is also utilized by the Japanese in the manufacture of macaroni and other paste foods. Samples of Canadian hard wheat flour were distributed among the leading manufacturers, for the purpose of having tests made alongside of winter wheat flour. In every case it was reported that Canadian flour proved the best in both quality and yield.

WHEAT.

There are several large flour mills in the northern part of Japan. The low quality of the native grown wheat produces a flour of a like character, and a certain amount of imported wheat has to be used for mixing in order to bring the quality of the flour up to a fair standard.

The Japanese have adopted the policy of importing raw material wherever practicable and completing the manufacture in their own country and with their own labour. This policy may be applied to the manufacture of flour, in which case, our Canadian producers and shippers of hard wheat will be able to cater to their wants with many favourable advantages.

These mills are even now turning to Canada for supplies of hard wheat, and if due attention is given to the wants of this market, it is not without the range of possibility to expect that in the near future a large part of our hard wheat may find an outlet westward via Vancouver for export to Japan and the far east.

TIMBER AND LUMBER.

Our exhibit of timber and lumber consisted of a large tree-section of British Columbia pine, dressed lumber, sash and doors. There is a large market in Japan for these lines, and we learned that while the products of our Canadian forests are in use in Japan, they have been sold there as being the product of Oregon and Wash-

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ington. Our British Columbia fir, which is unequalled in the world, has been shipped to Japan under the name of Oregon pine. The white ant is a formidable enemy to all foreign woods in the far east. A prominent lumber concern in Manila conducted a number of tests with foreign woods, for the purpose of ascertaining what kinds would successfully withstand the attack of this pest. Fir from British Columbia was among the woods tested, and it was found to be the only variety capable of fully resisting the ravages of this insect. It would be well for Canadian lumber interests on the Pacific coast if sales could be made direct, and explicitly specify that the woods supplied are of Canadian origin. By doing this the trade will be turned to what will in a short time be the only source of supply for large timber and lumber, as it is a well known fact that the forests of the Pacific coast states are being rapidly depleted. A large amount of railway construction and ship building is being carried on in Japan from year to year, and the demand for timber and lumber is a constant one.

We believe that box shooks could be marketed in Japan. Boxes and cases for export merchandise are wanted. There is no reason why a good machine made box could not be sold in competition with the hand made article now used in Japan. These boxes should be of light material and knocked down for shipment.

FURNITURE.

With the modern civilization which has sprung up in Japan, there has been created a tendency towards furnishing, at least, a part of the house in European fashion. Banks and large business houses are commencing to use our modern office furniture, such as roll-top desks, &c., &c. In addition to this, there is the ever present demand among the foreign residents for the latest ideas in household furniture. The Japanese attempt to imitate our styles in furniture, but owing to the lack of woods and to their crude workmanship, their product is far from being equal, either in durability or style, to the highly finished goods which our Canadian factories are capable of turning out. Furniture should be shipped in 'knocked down' shape in order to economize in the matter of freight charges. The ordinary class of furniture could be sent over in the 'white' and the varnish or paint put on by Japanese workmen.

SCHOOL DESKS.

Samples of double and single school desks were exhibited. The demand for high grades of these goods will be comparatively small, in fact, their sale will be limited to a few of the higher schools and colleges attended by the better classes.

MUSICAL INSTRUMENTS.

A beautiful upright piano was displayed as a type of our Canadian workmanship in that line. It was greatly admired, both for its tone and artistic finish. It was finally sold to the household of His Imperial Majesty the Emperor of Japan, for use in the Palace at Tokio. There is a limited demand for medium priced pianos and organs. Owing to the humidity in the climate of Japan, these instruments should be made as much proof against damp as possible.

STOVES AND COOKING UTENSILS.

This exhibit consisted of cooking ranges, oil stoves and cooking utensils. As the people come nearer the European mode of living, cooking ranges will become a necessity. Even now, there is a good demand for a cheap cooking range adapted for the use of coal, coke or wood. The several cooking utensils which usually accompany these

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stoves are also required. Coal oil stoves are in good demand, their use being quite general on account of the cheapness of kerosene.

HARDWARE.

A complete display of nuts, bolts, nails, wire rope chains, and horse shoes was made on neatly arranged pedestals. The annual import of these articles is large, the supplies coming from Great Britain, Germany and the United States. If our manufacturers can meet this competition, a good business can be done.

BICYCLES.

This exhibit consisted of a large frame to which was attached the various parts of a complete bicycle. The use of the wheel in Japan is increasing. The splendid roads in the cities and country make this means of locomotion convenient and pleasant. Bicycles intended for this market should be strong and cheap, so as to be within the reach of all classes. There will be no sale for ladies' wheels until the women change from their present style of dress to that of European. Automobiles are becoming quite popular in the country, several having been adopted by the Imperial government in its postal service. Horses being scarce, it is possible that automobiles may in time, become the means of transportation between places where there is no connecting railway.

CORDAGE.

A ton of hemp rope of various sizes was piled in pyramid form in a prominent location in the Canadian building. There is considerable rope manufactured in Japan, and also in Hong Kong. It is used principally in the shipping trade, and the sales are large. Cheap labour and proximity to raw materials tend to its cheapness, and it is doubtful if our factories can successfully compete.

RUBBER GOODS.

Our display in this line was very complete, consisting of rubber clothing, mechanical rubber goods, drug sundries, such as hot water bags, atomizers, &c., &c. Rubber clothing, such as rubber boots and rain-proof coats are required in the northern part of the Empire, where the winter season is unusually wet and slushy. A good trade has been done by the United States manufacturers in all lines of rubber goods, and by the introduction of our Canadian rubber goods, a fair amount of business can reasonably be expected, if our manufacturers will take the matter up.

METALLIC CEILING AND ROOFING.

In order to demonstrate the utility of metal as a substitute for wood or plaster in building, an artistic display of metal ceiling, shingles, &c., &c., was arranged in a prominent location, where its several uses could be illustrated. This class of interior and exterior finish, was comparatively unknown to the Japanese, and many inquiries were made regarding its composition, cost, &c., and where it might be obtained. There is a splendid opportunity for good business in this line, as there are several points to commend its use in Japan. A few of the reasons are:

First, its comparative cheapness and durability, as compared to wood and plaster for interior work or for shingles on roofs.

Second, its proof against fire, for in Japan fire is the constant dread of the people; large conflagrations being of frequent occurrence.

Third, the frequent earthquakes which occur in Japan cause considerable inconvenience and expense by the collapse of plastered ceilings.

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The government offices, banks, schools and large business firms of Japan, occupy buildings fully as pretentious both in size and architectural design as those of Canada or the United States. In buildings of this class, where repairs or changes affecting the walls of roofs are necessary, or in new buildings to be erected in the future, metallic work will find favour. Our manufacturers will do well to take advantage of our work of introduction by establishing good selling connections in Japan.

BUTTER.

Butter is a comparatively new acquisition to the diet of the Japanese. Its introduction came with the use of bread, and the combination may now be regarded as a portion of the bill of fare, of at least one meal a day. With the foreign residents, good butter is always in great demand. The market is supplied from many sources, chiefly France and the United States. Canadian butter holds a high place among its different competitors, and as a result of the advertising done at the exhibition, connections have been made with several first-class firms in Japan, who will henceforth handle Canadian butter in large quantities.

At one time oleomargarine was largely used by the Japanese, but returns of the imports for the last few years indicate that the amount of imitation butter imported is decreasing every year, while the imports of pure butter are increasing very rapidly.

CHEESE.

The Japanese have not yet acquired a taste for cheese, and for the present, sales are confined to the foreign residents. It is safe to predict, however, that when the use of butter becomes more general, the Japanese will take more kindly to cheese.

HAMS AND BACON.

The annual consumption of ham and bacon is comparatively small, but the comparison of the imports for the last few years indicate that their use is becoming more popular. The supply is almost entirely imported from the United States. The foreign residents and hotels require these goods constantly, and with them, the selection is a matter of quality rather than price. Canadian hams and bacon enjoy an excellent reputation for quality in both our home and European markets, and they can compete very favourably in quality and price with any goods now on sale in Japan.

CANNED GOODS.

The exhibits in canned goods consisted of fruits, meats, soups, fish, vegetables, condensed milk and cream. The products of our different Canadian canneries were arranged in graceful pyramids, being used as a covering for posts which, of necessity, occurred in several parts of the building. The number and variety of our exhibits in canned goods, was favourably commented upon, and as there is a market in Japan for all of these goods, our Canadian packers will find this introduction of Canadian canned goods of great assistance if they wish to invade this market.

BISCUITS.

A large pyramid showing nearly four hundred varieties of plain, fancy and mixed biscuits occupied a prominent place, and attracted considerable attention. English firms have been supplying the wants for this market, and considerable trade has been done, especially in sweet biscuits; the Japanese being fond of anything sweet. Of late years several factories have been started in the country, all equipped with modern machinery, and it seems as if the demand will in time be supplied by the local factories, and the foreign competition eventually shut out.

PULP AND PULP PRODUCT.

The exhibit of Canadian pulp wood, pulp and paper was a large one and aroused considerable interest on account of its combined commercial and educational features. It also conveyed a powerful object lesson of our vast resources of pulp wood, and also of the industrial efficiency of our manufacturers. The arrangement consisted first of a display of tree sections of the three principal pulp woods of Canada, namely: spruce, poplar and balsam. This was followed by samples showing the result of the different stages of manufacture, after which came a complete display of the finished products, such as printing paper, wrapping paper, wrinkled paper, tissue paper, pails, tubs, wash-bowls, &c., &c.

The Japanese are ever eager for knowledge, and as a result, have developed a taste for reading. Newspapers with enormous circulations are common in the different cities, while books and magazines are always in good demand. Japanese paper is not suitable for newspaper printing, or for books or magazines where a paper with a glazed surface is required. Our Canadian manufacturers can reach this market without any disadvantages, and our pulp manufacturers will find a sale for pulp board; the latter is imported to Japan, where the manufacture of paper is completed by local mills.

GENERAL REMARKS.

The foregoing pages include only a few of the many commodities which Canada can supply to Japan under favourable conditions. In Vancouver, B.C., Canada has a seaport nearer to Japan, both in time and distance, than any other port on the Pacific coast. The source of supply of such products as wheat, flour, lumber, fish, &c., is within easy reach of our western sea-board, thus placing us in the way of doing a large part of the trade with Japan in these lines.

It should be remembered that Japan is now the most progressive nation in the far east, and the result and effect of her progress is being watched by the neighbouring nations who may be expected at any time to follow the lead of Japan in the march of civilization. This will mean that they will become importers of the same goods as are now sold in Japan.

During the period of the exposition every means was used to make Canada and her resources, both natural and industrial, familiar to the Japanese and the other foreigners who attended the exposition. A book descriptive of Canada and her resources was distributed in both English and Japanese. Neat banners were hung in different parts of the building, on which were written in Japanese characters, sentences containing pointed facts as to the capacity of our Canadian producers and manufacturers to cater to the Japan trade. Copies of the Canadian trade index were distributed throughout hotels, chambers of commerce and leading business houses in Japan and China. In addition to this, our staff was continually engaged in interviews with parties interested in the purchase of Canadian goods, with the result that several business connections were formed and orders actually sent to Canada, which have, in some cases, to our certain knowledge, been repeated several times. Before returning to Canada we placed agencies for several lines of Canadian goods with reliable firms in Japan. It only remains for our Canadian producers and manufacturers, to follow up the excellent impression which our Canadian exhibits have made in Japan by exerting their utmost and immediate efforts in order to reap the benefit of the advertising which our government has done. They can be assured of not only a large trade, but one far reaching and permanent.

COMMERCIAL MUSEUMS.

The government of Japan maintains commercial museums in the principal cities. These museums have a section allotted for permanent exhibits of a foreign nature.

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There is no charge for space or for the care of exhibits, and any of our manufacturers wishing to place samples of their goods in these museums, can arrange to do so through the Department of Agriculture and Commerce of Tokio, Japan.

CUSTOMS DUTIES.

While the customs tariff of Japan has preferential features which apply only on certain articles from countries with which Japan has commercial treaties, it happens that the articles specified are not generally of Canadian production or origin. In most of the lines which we can supply, we are placed on equal terms with other countries.

TRADE MARKS AND PATENTS.

Canadian trade marks and patents have no protection at present in Japan. In view of the opportunity afforded for the sale of certain lines of manufactured goods on which it is desirable to protect the patent rights, I would respectfully suggest that the Canadian government should negotiate for recognition and protection of Canadian trade marks and patents in Japan.

WM. HUTCHISON,
Exhibition Commissioner.

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